Final Event Traffic Management Plan

Alerus Event Center and Canad Entertainment Complex

Prepared for:

Grand Forks-East Grand Forks MPO

Prepared by:

SRF Consulting Group, Inc.

October 2006

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ALERUS EVENT CENTER AND CANAD ENTERTAINMENT COMPLEX

Grand Forks, ND

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I. INTRODUCTION

BACKGROUND

The Alerus Event Center was opened in 2001 and has now operated for approximately five years. Prior to opening the Center an Event Traffic Management Plan was developed to manage traffic to and from the area. Since opening the Traffic Management Team has substantially modified the original plan. Facilities at the Alerus Center site are expanding to include the Canad Inn Hotel and Entertainment Complex, a hotel, indoor water park, wellness center, and future cinema among other things, are being constructed directly north of the Alerus Center. The Canad Complex will impact the Alerus Center parking capacity with the loss of approximately 800 parking spaces (nearly 20 percent of the existing parking capacity), access to the Alerus Center site will change, and on-site traffic circulation will change as well. The Alerus Center requested an update to their traffic management plan that accounts for these changes. In additions this updated plan recommends on and off site improvements to improve the overall operations for both the arrival and departure traffic flow.

The following plan recommends traffic management routines for events taking place at the Alerus Center based on the reconfiguration of the parking lots and site access changes being construction as part the Canad Complex as shown on the Preliminary site plan dated June 15, 2005 (see figure 2). The recommendations address traffic management needs generated during general Alerus Center events and also during University of North Dakota (UND) football games that include unique situations, e.g., club parking and tailgating areas. The plan is intended to efficiently and effectively direct traffic into and out of the Alerus Center site while minimizing conflicts between vehicles and between vehicles and pedestrians.

PROJECT STUDY REVIEW TEAM

This study was completed as a joint effort between the Grand Forks-East Grand Forks Metropolitan Planning Organization (MPO), City of Grand Forks and the Alerus Commission. The development of this report and the recommendations included with in were guided by a Study Review team comprised of the following member:

Earl Haugen	MPO
Mark Nelson	GF Police Department
Keith Schroeder	GF Police Department
Ray Tozer	Alerus Center
Jeremy Linstad	Alerus Center
Charlie Jeske	Alerus Center
Wayne Lambke	GF Engineering Department
Gary Urness	GF Engineering Department
Al Grasser	GF Engineering Department

II. EXISTING CONDITIONS

An extensive amount of data was collected from several sources prior to developing the recommended traffic management plan:

- Existing Background Mapping - The existing background mapping was provided to SRF in the form of an aerial photo, a copy of the existing parking layout, and the current traffic management plan was provided by the Alerus Center personnel. Figure 1 shows the existing site plan, existing parking spaces and existing departure lane usage. Currently there are approximately 4,100 paved parking spaces plus another 500 non-paved spaces that can be used for large events.

- Existing and Future Land Uses - The existing 2002 and 2025 land use data were taken form the MPO's Long Range Transportation Plan Update. This data was reviewed and used when determining the impact that future development may have on the peak hour background traffic.

- Existing Roadway Network Data and Traffic Signal Timing Data - The major roadways being studied as part of this project include I-29, 42nd Street, 34th Street, 32nd Avenue South, 17th Avenue South, 11th Avenue South and Demers Avenue. The functional classification of each of the roadways within the project area was taken from the Year 2000 Functional Classification out of the MPO's Long Range Transportation Plan Update. The classifications are as follows:

  - Interstate – I-29
  - Principal Arterial - Demers Avenue and 32nd Avenue South
  - Minor Arterial – 42nd Street and 17th Avenue South
  - Collector – 34th Street and 11th Avenue South

  The lane configuration, traffic control data and speed limit information were taken from the traffic count and Synchro files provided in electronic format by the GF-EGF MPO. The Synchro files were updated by SRF to reflect the current configuration data. Traffic signal timing data was provided as an electronic copy of Synchro files provided by the MPO.

- Traffic Counts and Forecasts – The 2000 Average Daily Traffic and 2025 Forecasted Average Daily Traffic Volumes were taken from the MPO's Long Range Transportation Plan Update. The MPO provided background traffic count data from 2005 for key intersections in electronic format. The MPO also provided large event traffic count data for key intersections in electronic format. The large event traffic data included both background traffic counts for the day before the event and on the day of the event. The large event count data was provided for the following concert events:

  - Montgomery Gentry Concert (February 25, 2005)
  - Motley Crue Concert (April 8, 2005)

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EXISTING SITE

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Figure 1

In addition to the traffic count data, video logs of the above events and several other events were provide as means to review the event traffic control procedures.

Technical Memorandum 1 in Appendix A has a full listing of the data that was collected as part of the study.

CURRENT TRAFFIC MANAGEMENT PROCEDURES

The Study Review Team compared the original traffic management plan to current practices as a first step to developing a new plan. The Study Review Team noted the following major differences:

- The original plan used three threshold attendances, but the current practice is to use a full traffic plan for any event that is estimated to exceed 3,000 in attendance.
- The original plan used an auto occupancy of 3.0, however based on experience the average auto occupancy is estimated at 2.0.
- The original plan estimated that as much as 69-percent of the traffic would access the site from the north. Based on observation and review of the traffic counts for a typical event approximately 50-percent access from the south, 25-percent from the northeast, and 25-percent form the northwest.
- The gate located at 11th Avenue South is not used to stop traffic from traveling east from the Alerus.
- The original plan recommended off site parking agreements for large events. Currently no parking agreements are in place. Shuttle buses are provided for large events but have not been sponsored by the Alerus. Shuttles are typically provided by private businesses and have been provided by UND in the past for football games.
- Fee Parking - Although discussed in the current traffic management plan as an option, fee parking has not been implemented a part of the current traffic operations plan.

Technical Memorandum 2 in Appendix A contains the full listing of the comparative review that was completed by the Study Review Team.

ON-SITE EVENT OBSERVATIONS

On-site observation of arrival and departure traffic was conducted on April 8, 2005 during the Motley Crue concert. The concert was held on a Friday night with a scheduled start time of 8:00 PM. The official attendance for the event was 5,692. It was estimated that approximately 2,300 vehicles were parked on site for this event (approximately 56-percent of on site capacity), and 20 to 30 shuttle bus drop-offs were made (this included some buses making multiple trips). All the shuttles were privately operated. The auto occupancy for this event was approximately 2.4 persons per vehicle, which is slight above the average of 2.0 persons per vehicle generally observed. Very little delay was noted during the arrival period.

During the event departure, traffic control officers along with Alerus traffic management personnel, were used at all three site entrances. Special event traffic signal timing plans were used at the intersections of 42nd Street and Demers Avenue, 42nd Street and 17th Avenue South, 38th Street and 32nd Avenue south and the east and west I-29 ramp intersections at 32nd Avenue South. The event was over around 10:50 PM and the parking lots were emptied by approximately 11:10 PM. The south parking lots emptied a few minutes earlier that the north parking lots. Vehicles exiting at Alerus Drive and travel northbound on 42nd Street conflict with vehicles exiting the parking lots at the north driveway, which appeared to contribute to the longer departure times from the north parking lots.

Technical Memorandum 2 in Appendix A contains the full description of the on site observations.

EXISTING PEAK HOUR TRAFFIC FLOW ANALYSIS

To determine how traffic is currently operating in the study area, traffic operations for existing conditions were analyzed at the following key intersections:

- 42nd Street and 17th Avenue South
- 42nd Street and 11th Avenue South
- 42nd Street and Demers Avenue
- 42nd Street and University Drive
- 42nd Street and Alerus North Access
- 42nd Street and Alerus Drive (Main Access)
- 42nd Street and Alerus South Access
- 38th Street and 32nd Avenue South
- 34th Street and 32nd Avenue South
- 34th Street and 17th Avenue South
- 34th Street and 11th Avenue South
- 34th Street and Demers Avenue South
- I-29 West Ramp and 32nd Avenue South
- I-29 East Ramp and 32nd Avenue South
- I-29 West Ramp and Demers Avenue
- I-29 East Ramp and Demers Avenue

Current p.m. peak hour turning movement counts for the key intersections were collected in year 2005 and provided by the MPO. Existing geometrics, traffic controls and peak hour traffic volumes for the key intersections were provided by the City Engineering Department.

An operations analysis was conducted for the p.m. peak hour at the key intersections to determine how traffic currently operates in the study area. All intersections were analyzed using the Synchro/SimTraffic software. Capacity analysis results identify a Level of Service (LOS) which indicates the quality of traffic flow through an intersection. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS F indicates an intersection where demand exceeds capacity, or a breakdown of traffic flow. LOS A through C are generally considered acceptable by drivers. LOS D indicates that an intersection is near its capacity and that vehicles experience moderate delays.

Table 1
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Level of Service P.M. Peak Hour
42nd Street and 17th Avenue South	A
42nd Street and 11th Avenue South*	A/A
42nd Street and Demers Avenue	C
42nd Street and University Drive	C
42nd Street and Alerus North Access*	A/A
42nd Street and Alerus Drive (Main Access)*	A/A
42nd Street and Alerus South Access*	A/A
38th Street and 32nd Avenue South	C
34th Street and 32nd Avenue South	C
34th Street and 17th Avenue South	B
34th Street and 11th Avenue South*	A/B
34th Street and Demers Avenue	A
I-29 West Ramp and 32nd Avenue South	B
I-29 East Ramp and 32nd Avenue South	A
I-29 West Ramp and Demers Avenue*	A/A
I-29 East Ramp and Demers Avenue*	A/A

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

Results of the analysis shown in Table 1 indicate that all key intersections currently operate at an acceptable LOS C or better during the p.m. peak hour, with existing traffic controls and geometric layout.

EXISTING EVENT DEPARTURE CONDITIONS

To determine how traffic currently operates during an event departure, traffic operations for existing concert departure conditions were analyzed at the following key intersections:

- 42nd Street and 17th Avenue South
- 42nd Street and 11th Avenue South
- 42nd Street and Demers Avenue
- 42nd Street and University Avenue
- 42nd Street and Alerus North Access
- 42nd Street and Alerus Drive (Main Access)
- 42nd Street and Alerus South Access
- 38th Street and 32nd Avenue South
- 34th Street and Demers Avenue

- I-29 West Ramp and 32nd Avenue South
- I-29 East Ramp and 32nd Avenue South
- I-29 West Ramp and Demers Avenue
- I-29 East Ramp and Demers Avenue

Turning movement counts were conducted by the MPO for an event departure during the Motley Crue concert on April 8, 2005. Concert attendance was 5,692 with an estimated 2,300 vehicles parking on site at the Alerus Center. Event observations noted that the event ended at 10:50pm and the parking lot was emptied in approximately 20 minutes.

In order to model the event departure, the peak 15-minute volumes were used and multiplied by four to determine the hourly equivalent. This volume represents the maximum volume that can leave the Alerus Center site from the current two exit points (i.e. four-lanes of traffic for the entire hour). The analysis assumes that all driveways to the Alerus Center are controlled by traffic control officers and traffic signal timing at adjacent intersections are adjusted to accommodate the heavy directional traffic. All traffic exiting from the north driveway was sent north on 42nd Street via dual left-turn lanes and all traffic exiting from the south driveway was sent south via dual right-turn lanes. Traffic exiting from Alerus Drive (middle access point) was split with approximately half departing to the north and half to the south on 42nd Street.

Results of the analysis shown in Table 2 indicate that all key intersections, with the exception of the Alerus Center driveways on 42nd Street and the intersections of 38th street/32nd Avenue South, currently operate at an acceptable overall LOS C or better, during the event departure.

Table 2
Current Event Departure Hour Conditions - Capacity Analysis
Level of Service Results

Intersection	Level of Service P.M. Peak Hour
42nd Street and 17th Avenue South	B
42nd Street and 11th Avenue South*	A/A
42nd Street and Demers Avenue	C
42nd Street and University Avenue South	C
42nd Street and Alerus North Access*	D/F
42nd Street and Alerus Drive (Main Access)*	D/F
42nd Street and Alerus South Access*	D/F
38th Street and 32nd Avenue South	D
34th Street and 17th Avenue South	B
34th Street and 11th Avenue South*	A/B

Table 2 (Continued)
Current Event Departure Hour Conditions - Capacity Analysis
Level of Service Results

Intersection	Level of Service
	P.M. Peak Hour
34th Street and Demers Avenue	A
I-29 West Ramp and 32nd Avenue South	A
I-29 East Ramp and 32nd Avenue South	A
I-29 West Ramp and Demers Avenue*	A/A
I-29 East Ramp and Demers Avenue*	A/A

* Indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

The Alerus Center driveways operate at poor levels of service due to capacity constraints at these intersections. The capacity of a single lane of traffic is approximately 900 vehicles per lane per hour, which limits the number of vehicles that can exit the site. The driveways from the parking lots meter vehicles that exit onto 42nd Street and adjacent intersections. Queuing develops mainly within the parking lots, minimal queuing exists on the local roadways. Alternatives that increase the volume exiting the site will result in greater volumes at downstream intersections. The intersection of 38th Street and 32nd Avenue South operates poorly due to the high volume of southbound event traffic. Recommended geometric improvements for this intersection are provided in the recommended traffic management plan.

III. PROPOSED SITE IMPROVEMENTS

The Canad Inn Hotel and Entertainment Complex will be located just to the north of and is attached to the Alerus Center. The proposed site plan dated June 15, 2005 for the Canad improvement was provided by the MPO and was used as the basis for determining on-site parking and circulation impacts. When completed, this complex is planned to contain the following uses:

- Hotel – 11 stories with 192 rooms.
- Wellness Center - 10,000 square feet.
- Day Spa – 6,000 square feet
- Restaurant 1- 250 seats
- Restaurant 2 - 200 seats
- Restaurant 3 – 150 seats
- Cocktail Lounge – 100 seats
- Aquatic Center – 50,000 square feet
- Cinema Complex (future construction) – 40,000 square feet with up to 10 screens.
- Unfinished Space (office/retail) – 10,000 square feet.

This complex is being constructed on the existing north parking lot and is expected to take approximately 800 existing parking stalls out of service. To mitigate this impact the grass area in the northeast portion of the site will be paved to provide approximately 500 new parking spaces. With these improvements the proposed site will provide approximately 3,800 on-site parking spaces to be used jointly by both facilities.

The three existing driveways to the site will remain in place and a new access will be created opposite 11th Avenue South. In the past, the use of 11th Avenue South has been restricted during events and only a limited amount of traffic has used it to access the site. Development of this new access point provides several advantages to the Alerus site, as well as the existing developments to the east of 42nd Street. This intersection is located midway between Demers Avenue and 17th Avenue South and the intersection spacing makes it an excellent location for a traffic signal. As background traffic grows on 42nd Street, side-street movements onto 42nd Street will become increasingly more difficult.

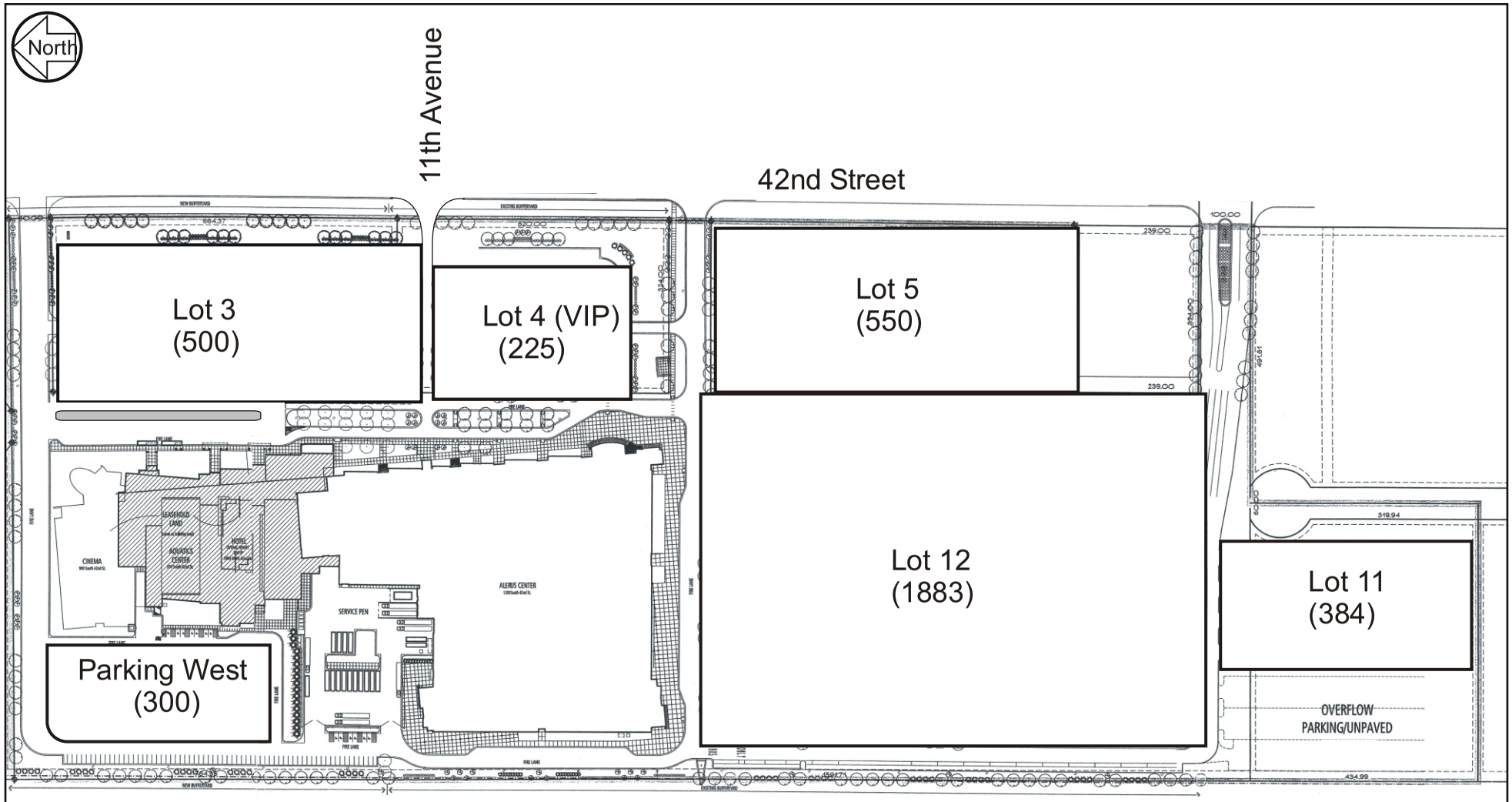
The 11th Avenue South site access will be used during events to serve the VIP parking lot, private limos and shuttle busses. Developing a separate access point for the shuttle buses and a limited number of cars will reduce the conflict between the busses and other vehicles, allowing the shuttles to operate more efficiently. During event departure, a limited number of vehicles will be directed east on 11th Avenue South, along with the shuttle busses. Sending a portion of the departing vehicles east on 11th Avenue South will reduce the congestion at the north driveway, thereby reducing the departure times for the vehicles exiting these lots.

On a daily basis, the 11th Avenue South access will provide a location that makes sense to signalize when warrants are met. A warrant analysis based on the daily traffic to and from the new Canad Complex shows that once it is in full operation, the added traffic during the peak hour will warrant the installation of a traffic signal. Traffic signals at this location will promote the daily use of the Alerus/Canad Complex and will enhance access to the neighborhoods east of 42nd Street.

The proposed site improvements, along with the parking lot capacities, are shown in Figure 2. The traffic operations and warrant analysis for the new access at 11th Avenue South is included in Appendix B.

IV. EVENT ASSUMPTIONS

The planning team made a number of assumptions about Alerus Center events in developing this plan. These assumptions were based on the data collected as part of the study process, proposed site plan drawings dated June 15, 2005 the on-site observations completed by SRF and meetings with the study review committee, City staff and the Canad Center's architect. The following are key assumptions used in developing the recommended traffic management plan:



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PROPOSED SITE IMPROVEMENTS

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Figure 2

- Roadway Improvements – As result of this planning effort, the traffic management plan recommends the construction 43rd Street from the Alerus Center south parking lot to 17th Avenue South and 17th Avenue South between 42nd Street and 43rd Street, to provide additional departure lanes. The plan also recommends the construction of capacity improvements on the north leg of the intersection of 38th Street and 32nd Avenue South.

- 42nd Street/11th Avenue South Access Driveway – All alternative scenarios assumed an additional driveway to the Alerus Center was constructed, to create the fourth leg of the intersection of 42nd Street and 11th Avenue South. The warrant analysis discussed above indicates that once the Canad Center is fully operational, a traffic signal will be warranted at this intersection for daily operations. However, this intersection would be control by a traffic controller officer during major events.

- Use of 11th Avenue South – All alternative scenarios assumed a portion of Alerus Center event traffic would use 11th Avenue South for both event arrival and departure.

- Event Types – The plan assumes two types of events: a general event and a UND football game. The recommendations for arrival and departure assume the entire parking lots will be full to capacity. Past practice has been that all events with an expected attendance of 3,000 or more will trigger the full event traffic management plan. Experience gained through continued operation of the center will allow the management team to determine what attendance levels will require fewer traffic control personnel than recommended for a full event.

- Available On-Site Parking Spaces – The plan assumes 3,800 parking spaces are available on-site, consisting of 3,300 existing paved spaces and 500 newly paved spaces in place of the existing grass parking area. This is 800 fewer parking spaces than the current condition (presently, there are approximately 4,600 parking spaces, consisting of 4,100 paved spaces and 500 grass spaces). Figure 2 shows the locations of the parking areas assumed for the plan. Note that the plan assumes that all the on-site spaces are being used and the southwest lot (overflow parking, unpaved) is not available. Assuming that all the spaces are being used for an event assumes that patrons of the Canad Center are also attending the event and would leave the site during departure. Therefore the total amount of departure traffic will be less assuming that some Alerus Center attendees will stay at the hotel or use the restaurant and lounge after an event. Assuming all on-site parked vehicles will depart after an event was considered to be a conservative approach.

- Available Off-Site Parking Spaces – The plan assumes 400 parking spaces are available at Altru Hospital for all Alerus Center events needing off-site parking. 1,800 additional spaces are needed for the UND game scenario. The UND campus appears to be the best location for these additional spaces given the large attendance base on campus. The 1,800 spaces represent 3,600 UND students, staff, cheer teams, etc. that originate on campus and would use shuttle service, rather than parking at the Alerus Center. For all other general events with more than 8,400 attendees, off-site parking

in addition the Altru Hospital site, will need to be arranged. (i.e. an additional 1,800 off-site spaces will be required for an attendance of 12,000).

- On-Street Parking – The study assumes on-street parking is prohibited. The Alerus Center should continue placing 'Road Closed, Neighborhood Parking Only' signs on the adjacent residential streets along 11th Avenue South as well as the 17th Avenue South/38th Street intersection, to dissuade event attendees from parking on the neighborhood streets.

- Vehicle Occupancy – The plan assumes vehicle occupancy of 2.0 people per vehicle. This is based on current occupancy information provided by Alerus Center staff. This assumption is considered conservative and it is very likely that the vehicle occupancy will increase as much as 25-percent for large events (greater that 10,000 attendance).

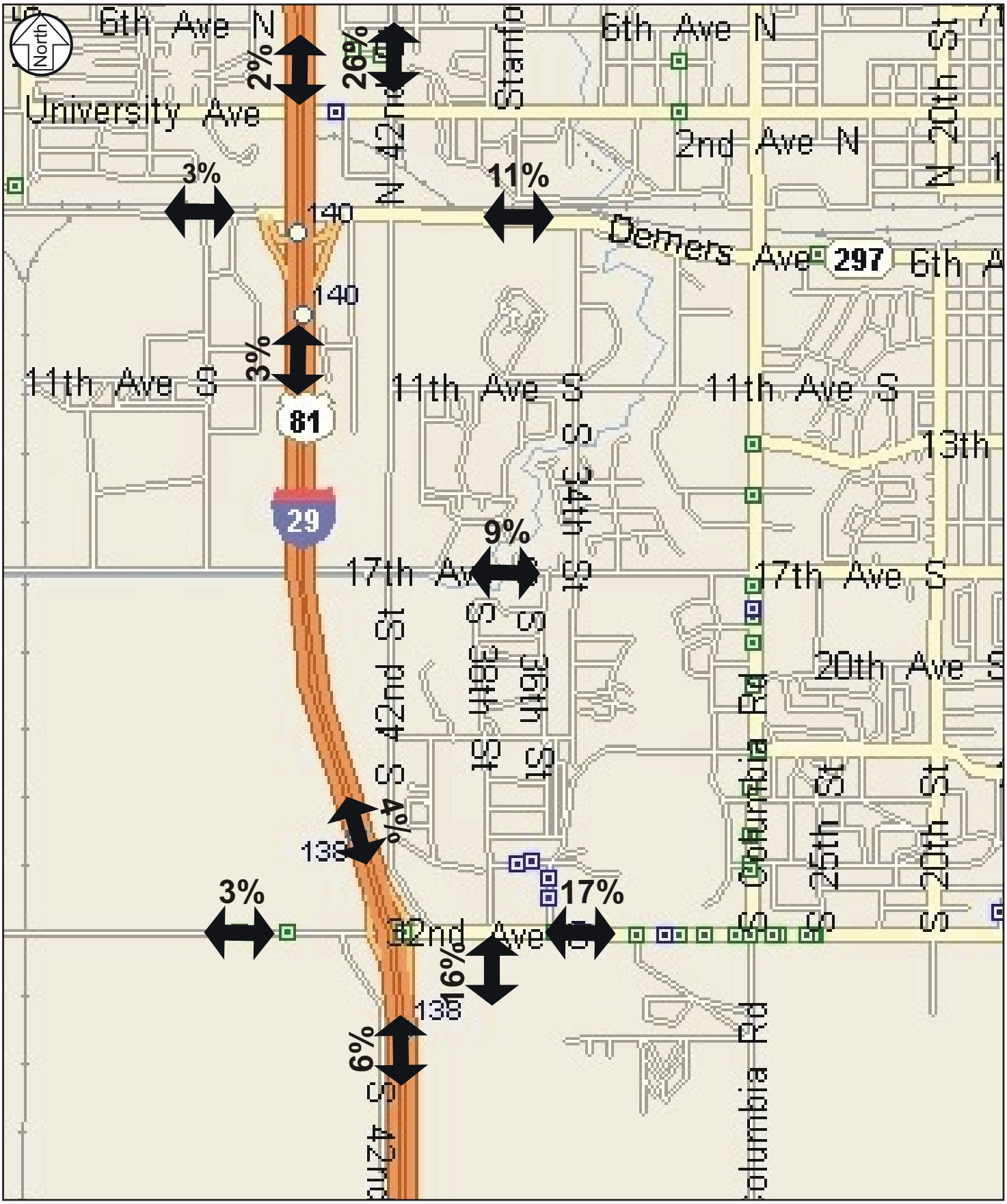
- Fee Parking – The current traffic operations plan does not include fee parking and it is not anticipated that fee parking will be implemented any time soon. If fee parking is implemented the vehicle occupancy is likely to increase.

  The current assumed occupancy is 2.0 persons per vehicle which is considered low based on information from other venues. Although we were not able to find any published studies documenting an increase in occupancy with fee parking, based on our discussions with operations personnel at other venues we believe that the occupancy would increase by 10 to 15 percent or more, depending on the event type, if fee parking is implemented. Although there are increased capital and operating expenses associated with fee parking it would slightly increase the event size that can be parked on-site and would produce a revenue stream that could be used to offset parking improvement costs.

  Due to the combined parking arrangement with the Canad complex, fee parking may be difficult to implement. The Alerus Traffic Management Team will have to work closely with the Canad complex if fee parking is implemented, to assure Canad that their customers will have access to free parking as required in their lease agreement with the City.

- Directional Distribution – Figure 3 illustrates the directional distribution assumed for the traffic to and from the Alerus Center site. This distribution was developed based on traffic count data provided by the MPO and is significantly different from the distribution assumptions in the previous traffic management plan.

- Roadway Capacity – For traffic exiting the Alerus Center site, the planning team assumed a four-second headway between cars; this translates into 900 vehicles per lane per hour with minimal interruptions (i.e., minimal stopping of the traffic stream to let conflicting movements go – e.g., at an intersection). The capacity of a center left-turn lane converted to a through lane with cones and signs was assumed to carry only 600 vehicles per hour per lane. Drivers are less comfortable using converted lanes, which generally reduces the capacity significantly.



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EVENT DIRECTIONAL DISTRIBUTION

Figure 3

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V. DEVELOPMENT AND EVALUATIONS OF ALTERNATIVES

The purpose of this analysis is to identify alternatives for an event departure scenario, as well as the necessary improvements for each alternative. As part of this analysis, we have identified key Event Management Principles that help form the basics for identifying the alternatives, as well as a simple way to compare event departure times.

PRINCIPLES

1) The exit time (departure) of the Alerus Center parking lots is a function of:
   - Number of exit points
   - Amount of conflicting traffic at exit points
   - Bottlenecks or choke points at downstream intersections
   - Amount of field staff to control flow at key points
2) The number of lanes traveling away from the site must be equal to or greater then the number of lanes exiting the site, or there will be potential queues or back-ups.
3) Traffic volumes will become more dispersed the further you are from the site, making intersections further from the site less likely to experience congestion or failure.
4) Background traffic during an evening event departure is very low which reduces conflicts with exiting traffic.

Another key element is the site discharge rate. This rate is dependent on many factors. A reasonable discharge rate assumption is 900 vehicles per lane per hour. This rate was confirmed by traffic counts collected for the peak 15 minutes of departure at the Alerus

Center driveways during the Motley Crue concert. For example, if there are four lanes exiting the site, four lanes x 900 vehicles per lane per hour = 3,600 vehicles per hour. An event at capacity under existing conditions can hold 4,125 vehicles on site. The expected time for all vehicles to exit the site will be 69 minutes (4,125 vehicles/3,600vehicles/hour), assuming equal use of each exit lane.

EVENT DEPARTURE ALTERNATIVES

Based on the above principles and discharge rate, the departure times for the site will not be reduced unless more exit points are added and/or the discharge rates increased. It is unlikely that the discharge rate can be significantly improved; therefore the focus of the alternatives was to obtain more exit points.

Figure 4 through Figure 7 show the current and three potential alternative exit configurations. A planning-level analysis of these alternatives is shown in Table 3, with the estimated exit time. These alternatives assume all available on-site parking spaces are used and the Canad Center will be fully constructed.

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PRESENT CONDITION -FOUR LANES OUTBOUND

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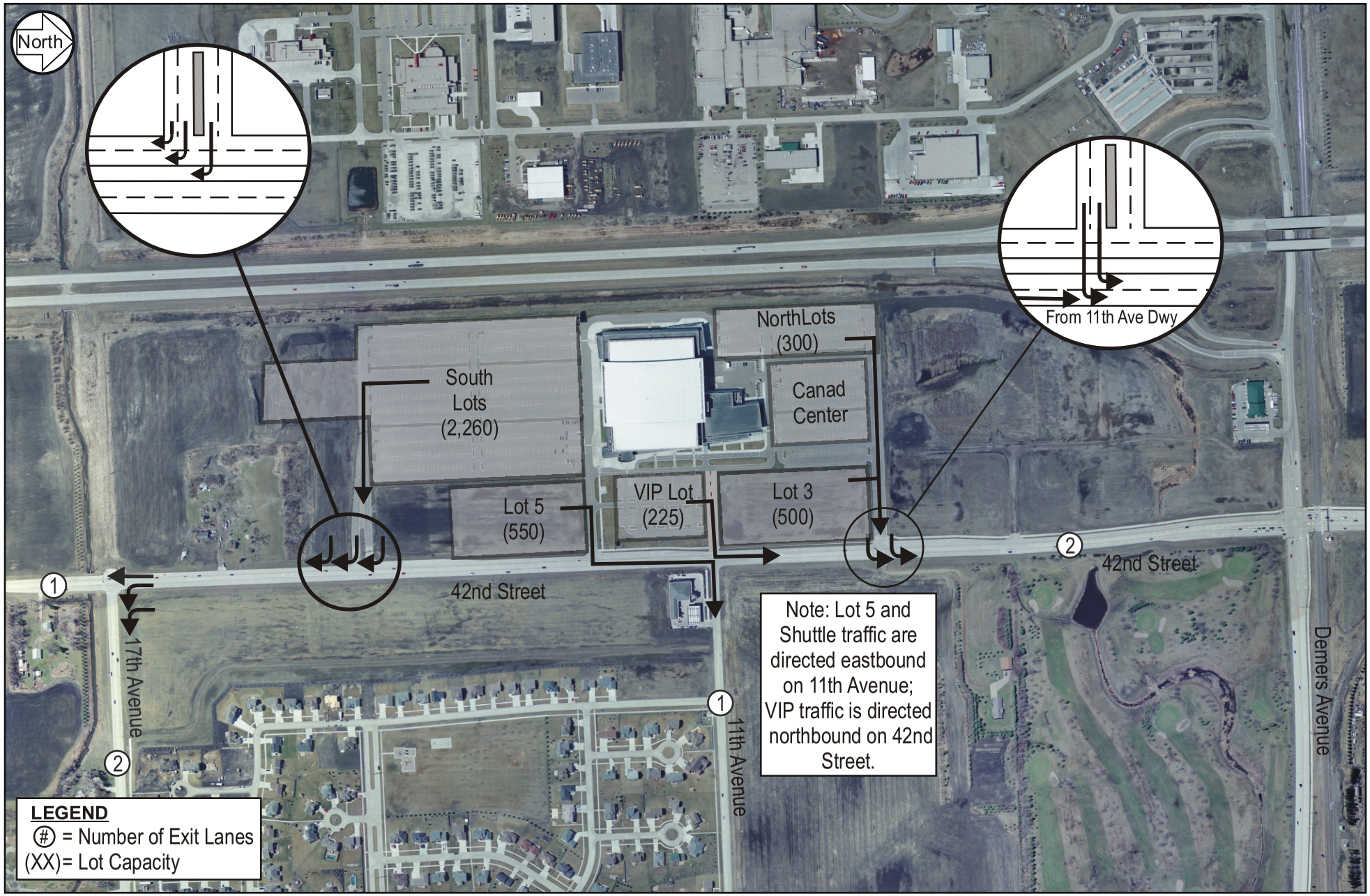
Figure 4



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ALTERNATIVE 1 -SIX LANES OUTBOUND

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Figure 5

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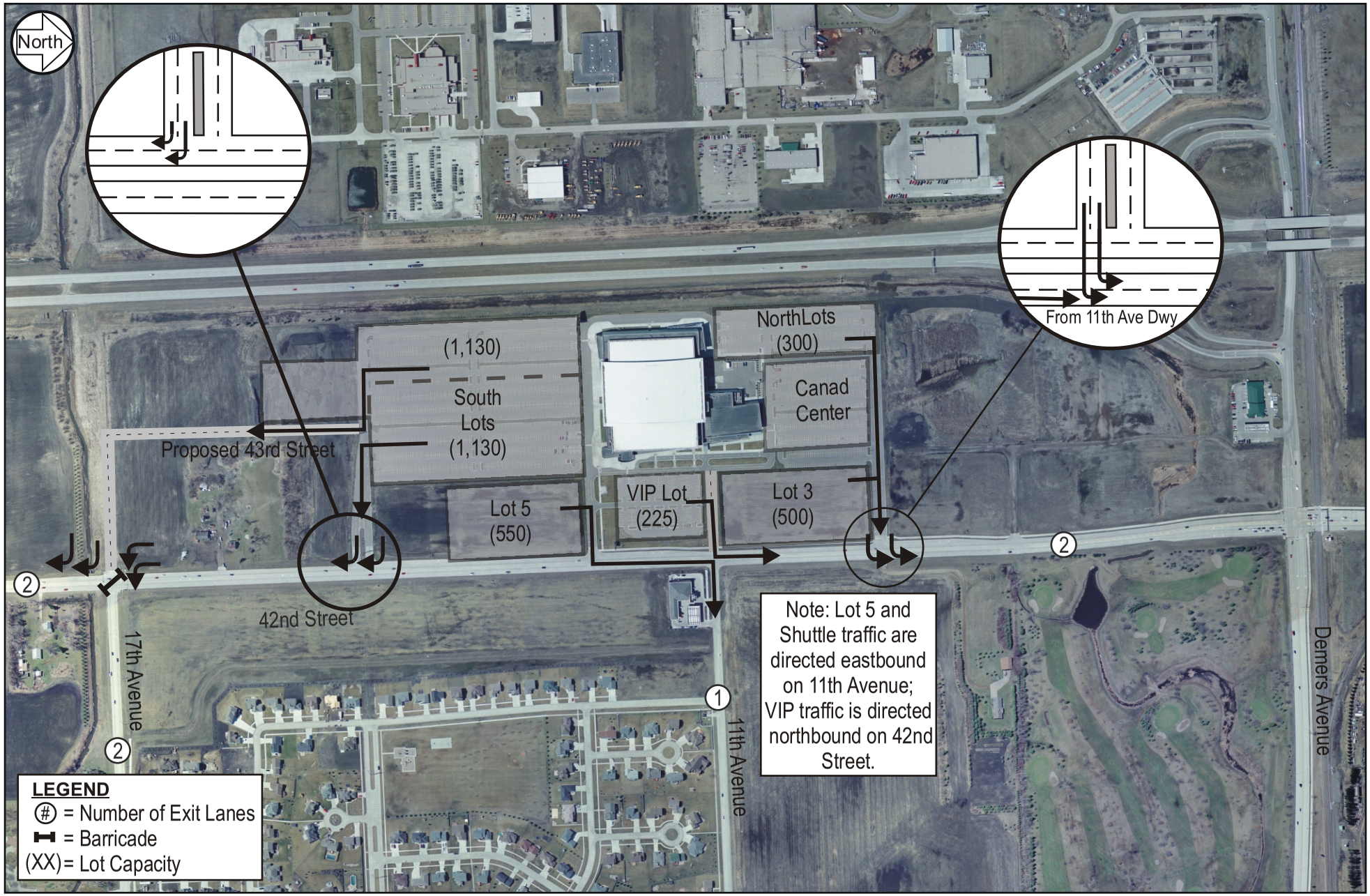

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ALTERNATIVE 2 -SEVEN LANES OUTBOUND

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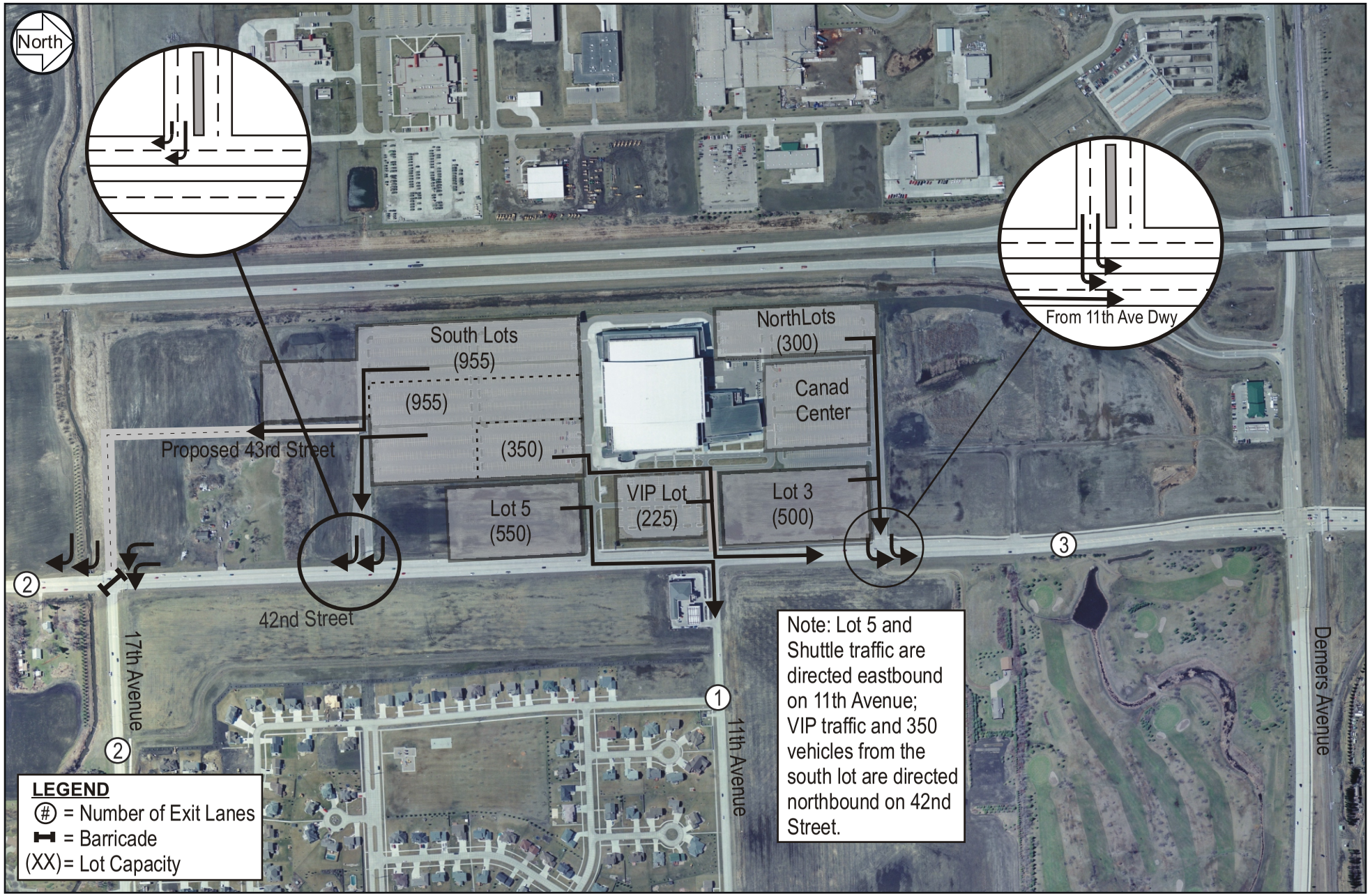
Figure 6



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ALTERNATIVE 3 -EIGHT LANES OUTBOUND

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Figure 7

Table 3
Event Departure Alternatives [A]

	Exit Direction	Number of Parking Spaces	Number of Outbound Lanes	Rate/ Lane (veh/ hour)[(2)]	Rate/ Hour (veh/ hour)	Longest Exit Time (mins.)	Percent reduction from Present condition [B]	Weighted Average Exit Time (mins.) [C]
Present Condition Four-lane Exit	SB on 42nd St.	2,640[(1)]	2	900 (2)	1,800	88[(3)]	N/A	37
	NB on 42nd St.	1,448[(1)]	2	900 (2)	1,800	48	N/A	
Alternative One Six-lane Exit	SB on 42nd St.	2,260	3	900 (2) 600 (1)	2,400	57	35	24
	EB on 11th Ave.	550	1	900 (1)	900	36		
	NB on 42nd St.	1,025	2	900 (2)	1,800	34	29[(4)]	
Alternative Two Seven-lane Exit	SB 42nd St. to EB 17th Ave.	1,130	2	900 (1) 600 (1)	1,500	45	49	20
	SB 42nd St. via 43rd St.	1,130	2	900 (1) 600 (1)	1,500	45		
	EB on 11th Ave.	550	1	900 (1)	900	36		
	NB on 42nd St.	1,025	2	900 (2)	1,800	34	29[(4)]	
Alternative Three Eight-lane Exit	SB 42nd St. to EB 17th Ave.	955	2	900 (1) 600 (1)	1,500	38	57	18
	SB 42nd St. via 43rd St.	955	2	900 (1) 600 (1)	1,500	38		
	EB on 11th Ave.	550	1	900 (1)	900	37		
	NB on 42nd St. via North Dwy	800	2	900 (1) 600 (1)	1,500	32	21	
	NB on 42nd St. via 11th Ave.	575[(5)]	1	900 (1)	900	38		

[A] All alternatives are also represented in Figures 4-7.

[B] The percent reduction is calculated separately for the exit direction and is the time reduction for the direction using the highest exit t imes.

[C] The weighted average exit time is calculated weighting the number of vehicles and the average time in takes each to exit, assuming the average departure time per vehicle is half of the longest exit time.

(1) Typically, during an event that is at capacity, traffic departing from Lot 3 and the VIP lot are directed half to the north and half to the south on 42nd Street.

(2) Assumes that the center left-turn lane that is temporarily used as a thru lane will only achieve 600 vph, thru lanes achieve 900 vph. Number of lanes per rate is shown in parenthesis.

(3) Relates to actual observations or testimony (Backstreet Boys 71 minutes)

(4) This reduction in exit time is a function of the reduced number of spaces in the north lot. It is not due to increased efficiency.

(5) Assumes 225 vehicles from the VIP lot and 350 vehicles from the south parking lot (see Figure 7)

- Present condition - Four-lane exit

  - No improvements required. Event departure will operate as it does today under current conditions.

- Alternative One - Six-lane exit (three lanes south and two lanes north on 42nd Street)

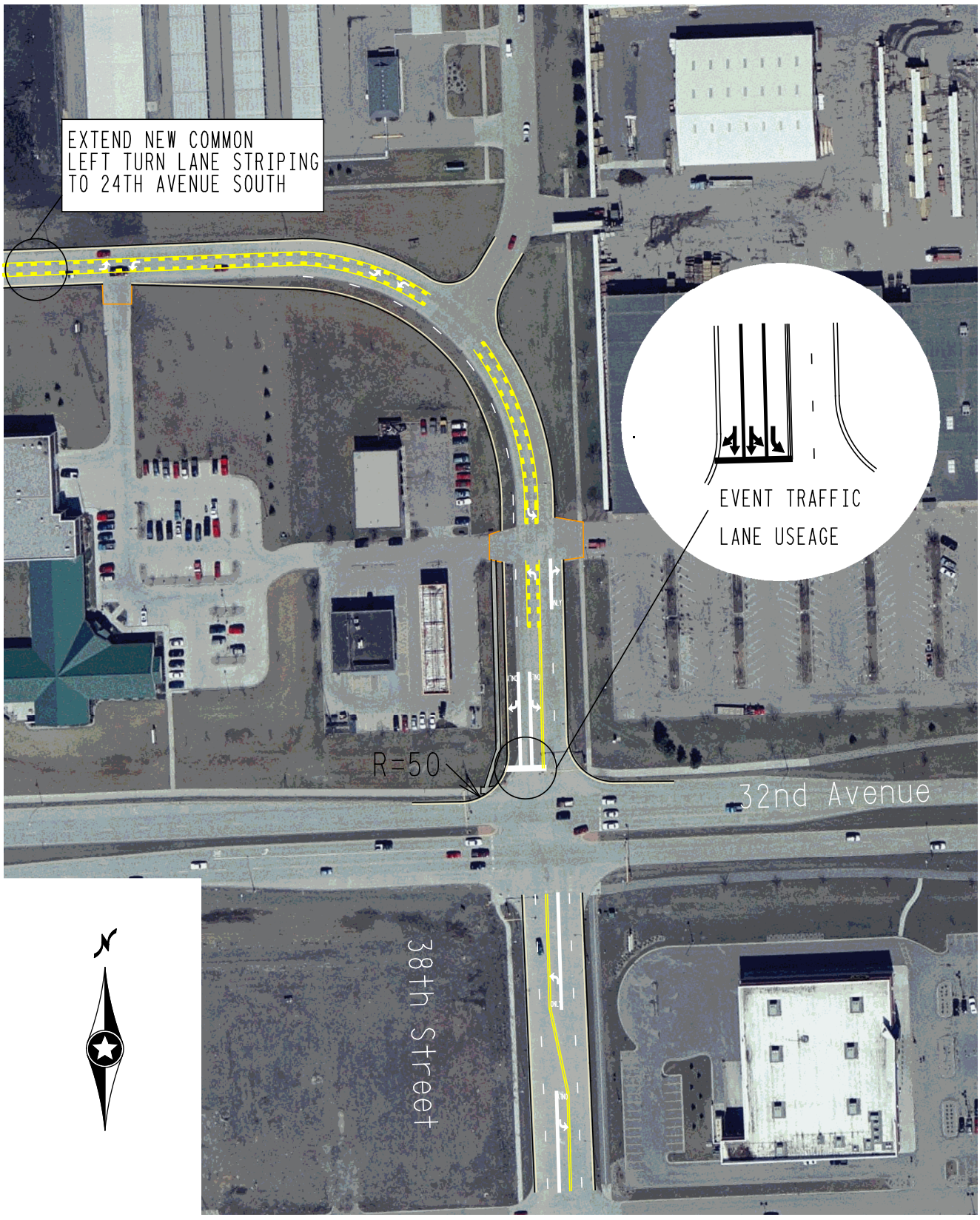
  - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue South
  - Three right-turn exit lanes will be coned at the south exit, leading the rightmost lane south on 42nd Street and remaining two lanes east on 17th Avenue South. This requires the center left-turn lane on 17th Avenue South to be coned as an eastbound through lane from 42nd Street to 34th Street. The intersection of 17th Avenue South and 34th Street would require police control.
  - This alternative would require additional changeable message signs to lead drivers to the correct lane.

- Alternative Two - Seven-lane exit (four lanes south and two lanes north on 42nd Street)

  - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue South.

    Construct a fourth leg to the west at the intersection of 42nd Street/17th Avenue South, and 43rd street from 17th Avenue South. to the south lot (see Figure 3). Dual right-turn lanes exiting the new driveway, via 17th Avenue South west leg, would be forced south on 42nd Street. Two lanes of traffic could be accommodated with the continuation of the three-lane section on 42nd Street between 24th Avenue South and 32nd Avenue South. The width of the road for this segment is wide enough to accommodate a three-lane section, but it would require restriping of this roadway for the southern portion between 24th Avenue South and 32nd Avenue South. The center left-turn lane would need to be coned as a southbound through lane for each event

  - Traffic exiting the Alerus Center's current south driveway would be forced south on 42nd Street and left on 17th Avenue South. In order to maximize capacity, dual right-turn lanes out of the south entrance with dual left-turn lanes onto 17th Avenue South are recommended with the center left-turn lane on 17th Avenue South to be coned as an eastbound through lane from 42nd Street to 34th Street. The intersection of 17th Avenue South/34th Street would require police control.
  - The intersection of 38th Street and 32nd Avenue South would become the critical intersection with twice as much traffic traveling southbound on 42nd Street. Geometrics for southbound traffic at this intersection would need to be modified for event departure to include a left turn lane, a center shared left-thru lane and a shared thru-right turn lane. The event signal timing for this intersection would need to be split-phased. Figure 8 shows the recommended improvements.



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SRF Consulting Group, Inc.

38TH STREET PROPOSED GEOMETRICS

Figure 8

ALERUS CENTER EVENT TRAFFIC STUDY

Grand Forks-East Grand Forks Metropolitan Planning Organization

5370
3/24/2006

- This alternative will also require the addition of two illuminated lane channelization sign mounted on the south bound mast arm at 38th Street and 32nd Avenue South to direct motorists to the correct lanes.
- This alternative would require additional changeable message signs to lead drivers to the correct lane.

- Alternative Three - Eight-lane exit (four lanes south and three lanes north on 42nd Street)
  - All vehicles parking in Lot 5 (550 vehicles) will exit at the center driveway and will be forced east on 11th Avenue South.
  - All vehicles parking in the VIP lot (225 vehicles) and 350 vehicles from the north end of the south lot will exit via 11th Avenue South and will be forced north in the rightmost lane on 42nd Avenue.
  - Vehicles will exit the north lot via dual left-turn lanes and will be forced north on 42nd Street. The continuous center left-turn lane on 42nd Street will be coned off as a temporary northbound through lane from the north driveway to Demers Avenue. Vehicles exiting the north lot will travel northbound on 42nd Street in the center left-turn lane and the leftmost through lane.
  - Operations for vehicles exiting the south lot and traveling south on 42nd Avenue South or east on 17th Avenue South will be the same as stated in Alternative Two.
  - This alternative would require additional changeable message signs to lead drivers to the correct lane.

ADDITIONAL ALTERNATIVES

Three additional alternatives were reviewed, but dropped from consideration due to cost. These alternatives are discussed below:

- Construction of an additional on-site parking lot to the north of the Canad Center. The cost to construct a lot similar in size to lot three (550 spaces) was calculated at $2.2 million. This cost includes land acquisition and construction. Due to cost, this alternative was dropped from consideration
- Construction of an I-29 overpass at 17th Avenue South. A review of the operations at the existing I-29 interchanges and grade separations shows that the volume of traffic bound for and/or west of I-29 represented a small portion of the overall flow (less than fifteen percent). Based on the event departure traffic analysis, the existing interchanges operate at a LOS A, therefore, the addition of the overpass is not justified base on existing travel shed. A review of the MPO's long range transportation plan indicates that a future 17th Avenue South/I-29 overpass will be needed as growth continues west of I-29. Future growth west of I-29 will eventually shift inbound and departure traffic patterns. The future 17th Avenue South/I-29 grade separation will be an integral part of future traffic management plans.

- Construction of direct on/off-ramps from I-29 into the Alerus Center parking lots. The volume of traffic leaving the site and destined to I-29 for most events is relatively low (two to six percent). Therefore little benefit would be realized with this improvement. Also, based on our knowledge of FHWA's interstate access policy and our experience in requesting interstate access changes, is it very unlikely that FHWA would approve this type of interstate access. Therefore construction of direct on/ off-ramps from I-29 was dropped from further consideration, as part of this update.

PREFERRED ALTERNATIVE SELECTION

Based on our analysis, Alternative Two is recommended because the time savings provided by this alternative was in line with the expectations and overall goals. The incremental time savings of Alternative Three wasn't significant enough given the additional costs for its implementation. In addition, there were a number of other considerations that were weighed in making this recommendation. These are as follows:

- The Canad Hotel operations would likely reduce the total event traffic load at the north driveway and therefore make the two-lane operation at the north entrance better than shown in Table 1. As a result, the wait time associated with the north entrance has the potential to be less than the 34 minutes shown in the table and therefore the actual time savings of Alternative Three over Alternative Two would be even less than what was estimated.
- Getting traffic from the south lot to the 11th Avenue South driveway is difficult and may interfere with the shuttle bus and other drop-off/pick-up traffic.
- Alternative Two reduces the longest wait time from 88 minutes (existing) to 45 minutes; this is almost a 50-percent reduction from the present event discharge time.
- The delay for Alternative Two is 12 minutes shorter that Alternative One (a 21-percent reduction over Alternative One).
- Departure time for Alternative Two is significantly less than one hour, which is one of the underlying goals of this project.

One of primary objectives of the plan is to significantly reduce the departure time, and another is to minimize conflicting movements thereby making intersections operate safely and at peak efficiency. We feel that Alternative Two meets these objectives.

PREFERRED ALTERNATIVE ANALYSIS

Additional analysis was conducted to determine how traffic will operate during an event departure under the preferred Alternative Two conditions. Alternative Two includes seven exit lanes with four lanes to the south and two lanes to the north on 42nd Street, one lane to the east on 11th Avenue South (see Figure 6). This analysis was completed assuming a full capacity event (3,800 vehicles).

Table 4
Proposed Event Departure Hour Conditions - Capacity Analysis
Level of Service Results

Intersection	Level of Service
	P.M. Peak Hour
42nd Street and 17th Avenue South	B
42nd Street and 11th Avenue South*	C/E
42nd Street and Demers Avenue	D
42nd Street and University Avenue South	B
42nd Street and Alerus North Access*	C/E
42nd Street and Alerus Drive (Main Access)*	D/E
42nd Street and Alerus South Access*	C/F
38th Street and 32nd Avenue South (1)	C
34th Street and 17th Avenue South	C
34th Street and 11th Avenue South	D
34th Street and Demers Avenue South	D
I-29 West Ramp and 32nd Avenue South	B
I-29 East Ramp and 32nd Avenue South	A
I-29 West Ramp and Demers Avenue*	B/C
I-29 East Ramp and Demers Avenue*	B/C

* indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS
(1) Analysis results assume recommended improvements listed above.

Results of the analysis are shown in Table 4 indicate that all key intersections, with the exception of the Alerus Center driveways on 42nd Street and the intersections of 42nd Street/Demers Avenue, 34th Street/11th Avenue South and 34th Street/Demers Avenue will operate at an acceptable overall LOS C or better, during the event departure, under Alternative Two conditions.

Unacceptable LOS at the side-street approaches are expected due to the high volume of vehicles attempting to exit the parking lots at the same time. Review of the modeling results for the intersection of 42nd Street and Demers Avenue indicates that the overall delay is approximately 38 seconds per vehicle, which is just above the LOS C threshold of 35 seconds per vehicle. Analysis results for current event departure conditions indicate that this intersection operates within the LOS C delay range. However, under Alternative Two conditions, additional traffic will be traveling north on 42nd Street and a portion of the traffic that exits east on 11th Avenue South will travel north on 34th Street and back west on Demers Avenue to access the I-29 interchange. As a result of the redirected traffic flow, a portion of the available green time at the intersection of 42nd Street and Demers Avenue will be used to serve westbound traffic, resulting in a

slight increase in overall delay and the associated decrease in the Level of Service. Also noted earlier, Canad Hotel operations may reduce the total traffic loading for northbound 42nd Street, which in turn may improve the overall level of service at this intersection. The use of a traffic control officer at this location should be considered (optional). This intersection should be monitored and a traffic control officer used if the delays become excessive.

PREFERRED ALTERNATIVE ESTIMATED COST

The cost for the preferred alternative includes both construction cost for the permanent improvements and the event traffic operations cost by event size. Permanent improvements include the new 11th Avenue South access, the new 43rd Street and 17th Avenue South access, and the intersection improvements at 38th Street and 32nd Avenue South. The event traffic operations cost includes the cost of providing variable message signs, stationary signs, cones, traffic control officers, Alerus traffic control staff, and shuttle busses. The permanent improvements are new costs, but the event traffic operations cost are not all new costs, since the Alerus already owns many of the items included in the estimated cost. In order to develop a per event cost for comparison purposes, standard rental rates were used to estimate the cost of the materials used during an event The Alerus already owns or will purchase many of the items and have them on hand for event traffic operations, therefore the actual Alerus per event cost will likely be less. Developing the event traffic operations cost in this manner provides a way to quantify the cost differential between two event sizes. The permanent improvement cost and event traffic operations costs are shown in Table 5, and the detailed cost are shown in Appendices B and C.

Table 5
Preferred Alternative Estimated Costs

Permanent Improvements	**Estimated Costs**
11th Avenue South Access, Turn Lanes, and Permanent Signal	$175,000
43rd Street /17th Avenue South Temporary Roadway Section	$262,650 [(1)]
43rd Street /17th Avenue South Full Urban Roadway Section	$616,450 [(1)]
38th Street/32nd Avenue South Intersection Improvement	$207,250
Event Traffic Operations	**Estimated Cost per Event**
Up to 8,400 Event Attendance	$9,300
Up to 12,000 Event Attendance	$26,800

(1) Because the cost of the full urban section is difficult to justify until the adjacent properties are developed both a temporary section and full urban roadway sections costs were considered for this improvement.

VI. TRAFFIC MANAGEMENT PLAN

In preparing the event traffic operations plan, the planning team strived to maintain the following key principles:

- Maximize the number of lanes available for vehicles going into or coming out of the Alerus Center site
- Minimize conflicting traffic flows, both vehicle and pedestrian flows
- Minimize friction between traffic flows, e.g., minimize the number of locations where vehicles travel in different directions or pedestrians travel in different directions than vehicles

The plan is made up of four scenarios, two in-bound scenarios (one for a general event and another for a UND football game) for traffic entering the Alerus Center site and two out-bound scenarios for traffic exiting the site. Each scenario recommends traffic routes, signing content and location, and locations for barricades and on/off-site traffic attendants/police. Specific recommendations for each scenario are summarized below. These recommendations are illustrated in Figures 9 through 12, along with detail Figures 9/10-A, 9/10-B, 11/12-A and 11/12-B which are located at the end of this report.

GENERAL EVENT: IN-BOUND TRAFFIC SCENARIO

The general event in-bound traffic management plan should be used for any event that is not a UND football game. Traffic management for UND football games is covered in an alternate plan below. The following are the key features for the non-football game scenario:

- Event Size and Parking Lot Locations – The planning team assumed a maximum general event size of 8,400. With a vehicle occupancy rate of 2.0 people per vehicle, this includes 3,800 vehicles parking on-site and 400 vehicles parking off-site at Altru Hospital. For general events where more than 8,400 attendees are anticipated, additional off-site parking is needed (off-site parking supplementing Altru Hospital) and the general event in-bound traffic management plan (signing, shuttle routes, etc.) should be modified to reflect the additional off-site parking. Table 6 summarizes general event sizes and the corresponding off-site parking needs.

Table 6
Event Size and Corresponding Parking Demand

Event Size (number of people)	Parking Demand (number of parking spaces)[(1)]			
		Off-Site		
	On-site	Altru Hospital	Other Off-Site Location	Shuttle Buses
Less than 7,600	up to 3,800	None	None	0
7,600 to 8,400	3,800	up to 400	None	3
More than 8,400	3,800	400	***Must be Arranged***	up to 25

[(1)] Note: Assumes a vehicle occupancy rate of 2.0 people per vehicle.

- Traffic Types, Site Entrances, and Parking Sequence – The scenario includes four entrances that handle emergency vehicle traffic, VIP traffic, private shuttle and limo traffic, Altru Hospital shuttle traffic, people with disabilities, and general vehicle traffic. Emergency vehicles access the site wherever needed. Figure 9 shows that the VIP traffic enters at the 42nd Street/11th Avenue South driveway and enters the VIP parking lot (Lot 4) from the north side. Private shuttles and limos enter at Alerus Drive, and exit at either the north or south driveway after dropping off their passengers.

  Shuttle traffic from Altru Hospital enters and exits at the 42nd Street/11th Avenue South driveway. For an event attracting up to 8,400 attendees, the planning team estimates three buses are needed to serve off-site, overflow parking at Altru Hospital [(1)]. The planning team assumed shuttle bus service would begin two hours before the event starts with the last shuttles leaving the Alerus Center approximately one hour after the event concludes (these times could be reduced by using a larger number of shuttle buses). Figure 9 illustrates the recommended shuttle route.

  Disabled patrons enter the site from the 42nd Street/11th Avenue South driveway and Alerus Drive. From the 42nd Street/11th Avenue South driveway, disabled patrons enter and park in the VIP parking lot (Lot 4) from the north side. From Alerus Drive, disabled patrons enter and park in the central lot (Lot 12) from the north side. Efforts should be made to assure that sufficient numbers of parking spaces for disabled patrons are reserved. The planning team recommends reserving spaces in the VIP lot (Lot 4) and also reserving the first several parking spaces in each row of the central lot (Lot 12). As stated, the planning team recommends loading Lot 12 disabled parking from Alerus Drive; however, if handicap patrons mistakenly enter Lot 12 from the south, the moving traffic control staff can let them pass and direct them to the northern spaces in Lot 12.

  General traffic enters the site from the north driveway, Alerus Drive, and the south driveway. General traffic from the north driveway fills the northeast lot (Lot 3), the

[1] Assumes approximately 400 vehicles park at Altru Hospital with 800 people traveling to/from their cars within 75 minutes.

west lot (Parking West), the west two rows of the central lot (Lot 12), and the south lot (Lot 11, if needed). General traffic from Alerus Drive fills the southeast lot (Lot 5); this entrance is closed after Lot 5 is filled. General traffic from the south driveway fills the remainder of the central lot (Lot 12) and then the south lot (Lot 11), if needed.

- Signage – Figure 9 shows the 25 signs needed to direct traffic and their locations. Ten signs are located on-site or at site entrances, while fifteen signs, including eight variable message signs, are located off-site on roadways adjacent to the Alerus Center. Static signs are assumed to be 42-inch, double post signs mounted seven feet above ground with black text/figures on white fields.
- Barricades and Cones – Figure 9 also shows 33 barricades needed to direct traffic and their locations. Details 9/10-A and 9/10- B show the cone layout needed to direct traffic at the north and south driveways. Approximately 108 cones are needed.
- Traffic control staff – The plan assumes a total of 28 traffic control staff, including 24 Alerus Center staff and four traffic control officers. Figure 9 shows the locations of the 24 Alerus Center staff on-site as well as the locations of the four police officers off-site. Note that this plan assumes a number of the Alerus Center traffic control staff shift from one part of the site to another part as parking areas fill.
- Traffic control staff are key components in effectively directing traffic to efficiently use available roadway and parking lot capacity. Three types of traffic control staff are shown on Figure 9: traffic control officers (green dots), moving Alerus Center staff (M) or stationary Alerus Center staff (S). Traffic control officers control conflicting traffic movements off-site, on 42nd Street. The planning team recommends that all four traffic control officers are off-duty. Moving staff direct traffic filling the parking lots. These staff should shift to other parking areas when the area where they are working fills. Figure 9 shows eight stationary staff. Their roles are as follows:
    - S1 – Aids officer in controlling traffic entering the site at the north driveway and makes sure traffic is effectively using both right turn lanes. When the northeast lot (Lot 3) and the west lot (Parking West) fill, this staff person closes the north driveway and aids the officer in directing southbound general traffic to the southeast lot (Lot 5) or to off-site parking.
    - S2 – Controls traffic entering the northeast lot (Lot 3) and makes sure only one lane of traffic turns into the parking lot. When Lot 3 fills, this staff person notifies S1 to close the north driveway and direct the traffic to Lot 5 or off-site parking.
    - S3 – Controls traffic entering the disabled/VIP lot (Lot 4).
    - S4 – Controls shuttle bus and pedestrian traffic where significant conflict is possible.
    - S5 – Aids officer in controlling traffic entering Alerus Drive from both the north and the south on 42nd Street. Redirects traffic to off-site parking when Lot 5 fills.
    - S6 – Directs private shuttle/limo traffic and handicap patron traffic to the west and general vehicle traffic into Lot 5. When Lot 5 fills, this staff person notifies S1 and S5 to direct general traffic to off-site parking.

- S7 – Aids officer in controlling traffic entering the site at the south driveway and makes sure traffic is effectively using both left turn lanes. Redirects traffic to off-site parking when Lots 11 and 12 fill.
- S8 – Controls traffic entering the handicap parking area of Lot 12.

- Estimated Cost – The cost of the general event traffic scenario is summarized in Table 5, and Appendix C.

UND FOOTBALL GAME: IN-BOUND TRAFFIC SCENARIO

The planning team developed a separate, in-bound plan for a UND football game due to the unique features it includes, namely club parking (e.g., Coaches Club, Directors Club, Emerald and Diamond Club) and an area for tailgating. Aside from the need for special parking areas, the football game traffic plan is similar to the general event plan in many ways. Figure 10 illustrates this scenario; its key features are as follows:

- Event Size and Parking Lot Locations – The planning team assumed 12,000 people attend UND football games, resulting in parking demand for 6,000 vehicles. This includes 3,800 vehicles parking on-site, 1,800 vehicles parking off-site (at or adjacent to UND), and 400 vehicles parking off-site at Altru Hospital.

- Traffic Types, Site Entrances, and Parking Sequence – The scenario includes four entrances that handle a larger mix of traffic as compared to the general event scenario. Entering traffic includes emergency vehicle traffic, private shuttle and limo traffic, VIP traffic, UND shuttle traffic, Altru Hospital shuttle traffic, club parking (Coaches, Directors, Emerald, and Diamond), tailgating traffic, people with disabilities, and general vehicle traffic. Emergency vehicles access the site wherever needed. Figure 10 shows private shuttles and limos enter Alerus Drive and exit at the north driveway after dropping off their passengers. VIP traffic enters at the 42nd Street/11th Avenue South driveway and enters the VIP parking lot (Lot 4) from the north side.

  Off-site overflow parking shuttles (the UND and Altru shuttles) enter and exit the Alerus Center site at the 42nd Street/11th Avenue South intersection. For a football game attracting 12,000 attendees, the planning team estimates 20 to 25 shuttle buses are needed to serve off-site overflow parking (17 to 22 buses traveling to/from UND and 3 buses to/from Altru Hospital) [(2)]. The planning team assumed shuttle bus service would begin two hours before kick-off, with the last shuttles leaving the Alerus Center approximately one hour after the game is over. Shuttles serve either UND or Altru Hospital, but not both. The shuttle buses should display signs clearly indicating their destination (UND or Altru Hospital). Figure 10 illustrates the recommended shuttle routes.

[2] Assumes approximately 1,800 vehicles park at UND and another 400 vehicles park at Altru Hospital with 4,400 people traveling to/from their cars within 75 minutes.

Club parking (Coaches, Directors, Emerald and Diamond Clubs) is located in the northern half of the central lot (Lot 12). To park in these areas, patrons enter the site from Alerus Drive.

Tailgate parking will continue to be located along the west side of the Alerus Center site, south of the building (on the west side of the central parking lot (Lot 12) and along the west site road). The planning team recommends closing access to the tailgating parking area one hour before kick-off; this closing time should be communicated to attendees.

Disabled patrons enter the site from the 42nd Street/11th Avenue South driveway ***only***. From the 42nd Street/11th Avenue South driveway, disabled patrons enter and park in the VIP parking lot (Lot 4) from the north side.

General traffic enters the site and fills the parking lots in a similar way as that described for the general event, in-bound traffic scenario (see the description above and Figure 10). The exception is that general traffic is ***not*** allowed to enter the central lot (Lot 12) from the north driveway or Alerus Drive due to club parking and conflicts with tailgating. Because of this exception, the study team recommends managing the north driveway entrance differently for the football game scenario. The north driveway details are described below:

- Phase 1: Figure 9/10-A shows that initially, two lanes of southbound traffic turn right into the north driveway. During this initial phase, the outside lane (traffic in the right-turn bay) is directed to the west lot (Parking West) and the inside lane (traffic turning from the southbound, outside through lane) is directed into the northeast lot (Lot 3).
- Phase 2: When Parking West is 2/3 full, the southbound *outside through lane* (currently filling Lot 3), *should be redirected* to start filling the southeast lot (Lot 5) farther south on the Alerus Center site. Traffic in the southbound *right-turn bay* (currently filling Parking West) *should be also redirected* to fill the remaining portion of Lot 3.
- Phase 3: When Lot 3 is nearly full, the *southbound right turn lane should be closed* and all traffic directed to Lot 5, or off-site parking. The entire north driveway is closed to in-bound traffic at this time.

Any traffic that remains queued on the north side of the Alerus Center site after the north driveway is closed, should be directed to park along the west side of the site, northwest of the Alerus Center building and immediately west of the Parking West lot. This area should be reserved for this purpose as this traffic cannot be redirected to Lot 12 from the north because of club and tailgating parking.

- Signage – Figure 10 shows the 28 signs needed to direct traffic and their locations. Twelve signs are located on-site or at site entrances, while sixteen signs, including eight variable message signs, are located off-site on roadways adjacent to the Alerus Center. Static signs are assumed to be 42-inch, double post signs mounted seven feet above ground with black text/figures on white fields.

- Barricades and Cones – Figure 10 also shows the 30 barricades needed to direct traffic and their locations. Figures 9/10-A and 9/10-B show the cone layout needed to direct traffic at the north and south driveways. Approximately 108 cones are needed.
- Traffic control staff – The plan assumes a total of 26 traffic control staff, including 22 Alerus Center staff (supplemented with UND staff for the Club Parking) and four traffic control officers. Figure 10 shows the locations of the 22 Alerus Center staff on-site as well as the locations of the four officers off-site. Note that this plan assumes Alerus Center traffic control staff shift from one part of the site to another part as parking areas fill.

  Traffic control staff is a key component in effectively directing traffic to efficiently use available roadway and parking lot capacity. Three types of traffic control staff are shown on Figure 10: traffic control officers (green dots), moving Alerus Center/ UND staff (M) or stationary Alerus Center/UND staff (S). Traffic control officers control conflicting traffic movements off-site, on 42nd Street. The planning team recommends that all four officers are off duty. Moving staff direct traffic while filling the parking lots. These staff would shift to other parking areas when the area where they are working fills. Figure 10 shows ten stationary staff. Their roles are as follows:

  - S1 – Aids officer in controlling traffic entering the site at the north driveway and makes sure traffic is effectively using both right turn lanes. This staff person reroutes the southbound through traffic lane to the southeast lot (Lot 5) when the west lot (Parking West) is 2/3 full, filling the remainder of Lot 3 with traffic from the right-turn bay, and closes the right turn bay and the north driveway to in-bound traffic when the northeast lot (Lot 3) fills, redirecting all southbound general traffic to the southeast lot (Lot 5) or to off-site parking. For more detail on the north driveway management, see the previous page.
  - S2 – Controls traffic entering the northeast lot (Lot 3) and makes sure only one lane of traffic turns into the parking lot. When Lot 3 fills, this staff person notifies S1 to close the north driveway and direct the traffic to Lot 5 or off-site parking.
  - S3 – Controls traffic entering the disabled/VIP lot (Lot 4).
  - S4 – Controls shuttle bus and pedestrian traffic where significant conflict is possible.
  - S5 – Aids officer in controlling traffic entering Alerus Drive from both the north and the south on 42nd Street. Redirects traffic to off-site parking when Lot 5 fills.
  - S6 – Directs private shuttle/limo and club (e.g., Coaches Club, Directors Club, etc.) traffic to the west and general vehicle traffic into Lot 5. When Lot 5 fills, this staff person notifies S1 and S5 to direct general traffic to off-site parking.
  - S7 – Aids officer in controlling traffic entering the site at the south driveway and makes sure traffic is effectively using both left turn lanes. Redirects traffic to off-site parking when Lots 11 and 12 fill.
  - S8 – Controls traffic entering the Directors and Emerald and Diamond Club parking areas. Verifies each vehicle has the appropriate pass.

- S9, S10 – Controls traffic entering the Coaches Club parking area. Verifies each vehicle has the appropriate pass.

- Estimated Cost – The cost of the UND football game traffic scenario is summarized in Table 5, and Appendix C.

GENERAL EVENT AND UND FOOTBALL GAME: OUT-BOUND TRAFFIC SCENARIO

The out-bound traffic scenarios are nearly the same for both the general event and UND football game. Figure 11 (general event) and 12 (UND football game) illustrate the scenarios. Key features are as following:

- Traffic Types and Site Access – The out-bound traffic scenario includes out-bound traffic exiting the site, but also in-bound private shuttle, limo, shuttle, and pick-up traffic entering the site to pick up passengers who attended the event. The traffic patterns for each event type are discussed separately in the following paragraphs.

  General Event

  For the general event, three site driveways serve exclusively as exits and two locations serves as both exits and entrances. The three "exit only" are the north driveway, the south driveway, and the new 43rd Street/17th Avenue South exit route. The north driveway serves traffic exiting from the northeast lot (Lot 3), the west lot (Parking West) and private shuttle/limo staging area on Alerus Drive west of the pedestrian blockade. At the south driveway, traffic exits from the east two-thirds of the central lot (Lot 12). The 43rd Street/17th Avenue South exit route serves the west one-third of the central lot (Lot 12), the south lot (Lot 11), and private shuttle/limo staging area on Alerus Drive west of the pedestrian blockade.

  The 42nd Street/11th Avenue South driveway and Alerus Drive serve as both entrances and exits. The Altru Hospital shuttle enters and exits at the 42nd Street/11th Avenue South driveway; this driveway also serves traffic exiting from the VIP lot (Lot 4), and from the private shuttle/limo/pick-up staging area east of the Alerus Center. Alerus Drive serves as both an entrance to shuttle/limo/pick-up traffic and as an exit. Traffic exiting at Alerus Drive is from the southeast lot (Lot 5).

  UND Football Game

  Like the general event, three site driveways serve exclusively as exits and the same two locations serves as both exits and entrances for the out-bound football game traffic scenario. The three "exit only" are the north driveway, the south driveway, and the new 43rd Street/17th Avenue South exit route. For a football game, the north driveway serves traffic exiting from the northeast lot (Lot 3), the west lot (Parking West), and from the private shuttle/limo staging area on Alerus Drive west of the pedestrian blockade. At the south driveway, traffic exits from the east half central (Lot 12) except the Emerald, Diamond, and Directors Club parking. The 43rd Street/17th

Avenue South exit route serves the west half of the central lot (Lot 12), and the south lot (Lot 11).

The 42nd Street/11th Avenue South driveway and Alerus Drive serve as both entrances and exits. The Altru Hospital shuttles and UND shuttles enters and exits at the 42nd Street/11th Avenue South driveway; this driveway also serves traffic exiting from the VIP lot (Lot 4), and from the private shuttle/limo/pick-up staging area east of the Alerus Center. Alerus Drive serves as an entrance for shuttle/limo/pick-up traffic, and serves as the exit from the northeastern quarter of the central lot (Lot 12, Directors, Emerald, and Diamond Club parking), and traffic exiting from the southeast lot (Lot 5).

- Signage – Figures 11 and 12 show the signs needed to direct traffic and their locations. Four stationary signs are located on-site and one is located off-site. Static signs are assumed to be 42-inch, double post signs mounted seven feet above ground with black text/figures on white fields.
- Barricades and Cones – Figures 11 and 12 also show the 30-32 barricades needed to direct traffic and their locations (32 for a general event, 30 for a football game). Note that Alerus Drive south of the Alerus Center building will be closed to vehicle traffic 30 minutes before the event concludes to accommodate the large, exiting pedestrian flow. Figures 11/12-A and 11/12-B show the cone layout needed to direct traffic at the north and south driveways; and the 43rd Street/17th Avenue South exit route. Approximately 201 cones are needed.
- Traffic Control Staff – The scenario assumes a total of 28 traffic control staff, including 16 Alerus Center staff and 12 traffic control officers. Figures 11 and 12 show the locations of the Alerus Center staff on-site as well as the locations of the traffic control officers off-site.

  Traffic control staff is a key component in effectively directing traffic to efficiently use available roadway capacity. Two types of traffic control staff are shown on Figures 11 and 12: traffic control officers (green dots) and stationary Alerus Center staff (S). Officers control conflicting traffic movements off-site at remote intersections on the key exit routes and on roadways adjacent to the Alerus Center site driveways. The planning team recommends that all officers are off duty. Figures 11 and 12 show 16 stationary staff; their roles are as follows:

  - S15, S16 – Aids officers in controlling traffic exiting the site at the north driveway and makes sure traffic is effectively using both left turn lanes.
  - S17 – Controls traffic exiting the northeast lot (Lot 3) and makes sure traffic is forming two left turn lanes.
  - S18, S19 – Aids officer in controlling traffic exiting the site from the disabled/VIP lot (Lot 4).
  - S20 – Controls traffic exiting the disabled/VIP lot (Lot 4).

- S21 – Controls shuttle bus and pedestrian traffic where significant conflict is possible.
- S22, S23 – Aids police officers in controlling emergency/private shuttle/limo/pick-up traffic entering the site at Alerus Drive and traffic exiting the site at Alerus Drive from the southeast lot (Lot 5).
- S24 – Directs emergency/private shuttle/limo/pick-up traffic and general vehicle traffic from Lot 5.
- S25, S26 – Aids police officers in controlling traffic exiting the site at the south driveway and makes sure traffic is forming two right turn lanes.
- S27 - Controls traffic exiting from the central and south lots (Lots 11 and 12) and sends two lanes of traffic south on the 43rd Street/17th Avenue South exit route.
- S28 *(General Event)* – Controls private shuttle/limo traffic.
- S28 *(Football Game)* – Controls tailgating traffic and its merge with traffic exiting from the central lot (Lot 12).
- S29, S30 – Aids officers in controlling traffic at the 17th Avenue South and 42nd Street intersections making sure south bound traffic is effectively using both left turn lanes to access eastbound 17th Avenue South and both right turn lanes to access south bound 42nd Street.

- Estimated Time to Exit the Site – If the out-bound traffic recommendations are implemented, all traffic parked on site can exit the Alerus Center in 45 minutes or less. Table 3 shows the maximum exit time for each of the four major exit routes.

  The exit times shown in Table 3 assume that there are minimal interruptions from background traffic on the local streets, and traffic operates according to the geometry shown in Figures 9 through 12 and the details shown in Figures 9/10-A and B and 11/12- A and B[3]. Significant interruptions from background traffic or deviation from the recommended geometry will result in longer exit times. The planning team recommends putting substantial effort toward detouring background traffic away from the Alerus Center onto other local streets when Alerus Center events are exiting and toward guiding traffic to efficiently use the recommended lane geometries. Figure 11 general event) and 12 (football game) shows recommended signing and locations for traffic control staff.
- Estimated Cost – The cost of the two event traffic scenarios is summarized in Table 5, and Appendix C.

[3] There is generally minimal background traffic on the local streets when Alerus Center events are exiting.

EVENT IMPLEMENTATION

Table 7 summarizes traffic control staff duties for each of the three scenarios. This summary matrix can be used along with Figures 9 through 12 and the details shown in Figures 9/10-A, 9/10-B, 11/12-A, and 11/12-B in the field for implementation of the event traffic management plan.

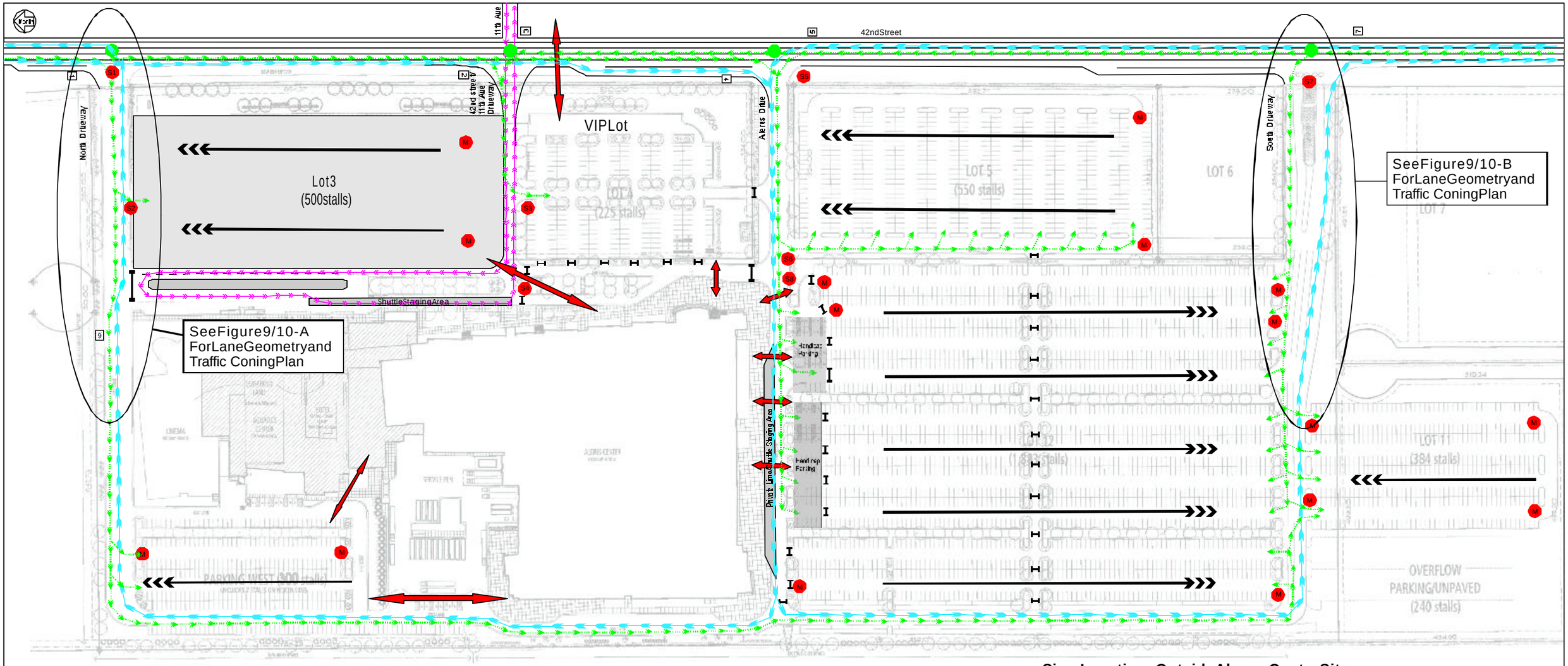
VII. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The objective of the Event Traffic Manage Plan for the Alerus Event Center and Canad Entertainment Complex is to provide a set of traffic management routines for the management of traffic flows before and after major events at the Alerus. The Alerus Event Center has been in operation since 2001, and prior to opening the center an Event Traffic Management Plan was developed. Current traffic management procedures are a combination of the recommended procedures outlined in the original traffic management plan as modifications through the experience of the Traffic Management Team. The development of this plan also relied heavy on the experience and knowledge of the professionals that are currently charged with traffic management at the Alerus.

The addition of the Canad Entertainment Complex will require significant changes in the current traffic management procedures to account for the reconfiguration of the on-site parking and to account for site access and circulation modifications. Following is a summary of the major findings and recommendation of this study:

- Construction of the Canad Entertainment Complex will reduce the total number of on-site parking spaces by approximately 800 spaces for a total of 3800 on-site spaces.
- Events with attendance of up to 7,600 can be accommodated on-site; events with attendance of up to 8,400 will require a minimum of 400 off-site parking spaces (assumed to be at Altru Hospital) and a minimum of 3 Alerus sponsored shuttle buses; events with attendance over 8,400 will require that additional parking be arranged. As an example a UND Football game with attendance of 12,000 will require a total of 2,200 off-site parking spaces (400 at Altru Hospital and 1,800 at other locations) and a total of 25 shuttle buses.
- To improve site access (better ingress and egress) additional access points are needed. The following on-site improvements are recommended to improve access:
    - Construct a new site access at 11th Avenue South and 42nd Street which will create a four legged intersections and improve access to both 42nd Street and 11th Avenue South
    - Construct 43rd Street between the south parking lots and 17th Avenue South; and construct 17th Avenue South between 42nd Street and 43rd Street.
- The total time to empty the parking lots can be reduced by allowing a portion of the vehicle traffic and shuttle bus traffic to use 11th Avenue South east of 42nd Street.

- The only off-site roadway improvement recommended to reduce exit times is an intersection improvement at 38th Street and 32nd Avenue South.
- The time to empty the parking lots is dependent on the total number of exit lanes available and an exit plan that reduces conflicts between exiting traffic streams.
- It is recommended that Alternative Two (seven exit lanes) be fully implemented along with the traffic management plan outlined in Section VI of this report. If fully implemented the average exit time per vehicle when the on-site parking lots are full is reduced from 37 minutes to 20 minutes, and all vehicles can exit the site within 45 minutes.
- An interim plan will be needed for events that occur during the construction of the Canad Entertainment Complex and for events that occur prior to the completion of all the recommended on-site and off-site improvements. Appendix five contains a summary of the interim plan that was developed in conjunction with this report.
- It is recommended that this plan be a "Living Document" with annual reviews and periodic updates based on input form the Alerus/Canad Traffic Management Team, Grand Forks Police Department and City Engineering/Planning Staff.



Legend

- = Vehicle traffic (Inbound)
- = Private shuttles/limos
- = Altru/Alerus shuttle
- = Blockedentrance
- = Pedestrian flow
- = Direction offill
- S# = Stationaryparkingattendant
- M = Parkingattendantmoves with vehiclesasrowsfill
- = Trafficcontrolofficer

Signage Key

Stationarysigns

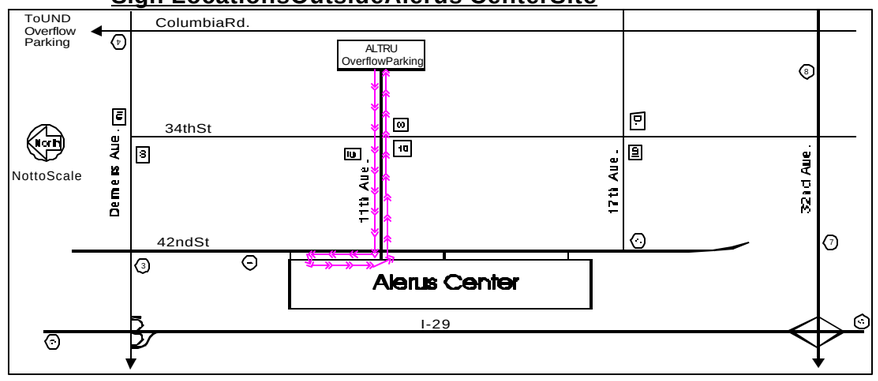
1	VIP/ DROP-OFF	EVENT PARKING	5	HANDICAP/ DROP-OFF ONLY	6 FORM ONE LANE
2	EVENT PARKING/ DROP-OFF	VIP/HANDICAP ONLY	7	EVENT PARKING	HANDICAP/ VIP/ DROP-OFF
3	VIP/HANDICAP ONLY		8	OVERFLOW PARKING ATALTRU	
4	EVENT PARKING/ DROP-OFF		9	OVERFLOW PARKING ATALTRU	10 OVERFLOW PARKING ATALTRU

VMSsigns

	Initial	WhenAlerusParkingisFull
1	GEN EVENT PARKING → RIGHT TWO LANES → VIP/ DROP-OFF → LEFT LANE	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFT ON 11THAVE
2	GEN EVENT PARKING → LEFT TWO LANES → VIP/ DROP-OFF CLUB → RIGHT LANE	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHT ON 17THAVE
3	EVENT PARKING → RIGHT ON 42NDST. → PARKING& FREE SHUTTLE → RIGHT ON 34THST	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHT ON 34THST
4	EVENT PARKING → LEFT ON 42NDST. → PARKING& FREE SHUTTLE → LEFT ON 34THST	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFT ON 34THST
5	ALERUS NEXT EXIT → RIGHT ON 32NDAVE	ALERUS NEXT EXIT → RIGHT ON 32NDAVE
6	ALERUS NEXT EXIT → LEFT ON DEMERS	ALERUS NEXT EXIT → LEFT ON DEMERS
7	EVENT PARKING → LEFTON 38TH STREET → PARKING& FREE SHUTTLE → LEFTON 34TH STREET	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFTON 34TH STREET
8	EVENT PARKING → RIGHTON 38TH STREET → PARKING& FREE SHUTTLE → RIGHTON 34TH STREET	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHTON 34TH STREET

*VMSSigns5,6,7,8areoptional

Sign LocationsOutsideAlerus CenterSite



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GENERALEVENTINBOUND TRAFFIC

ALERUS CENTEREVENTTRAFFICSTUDY
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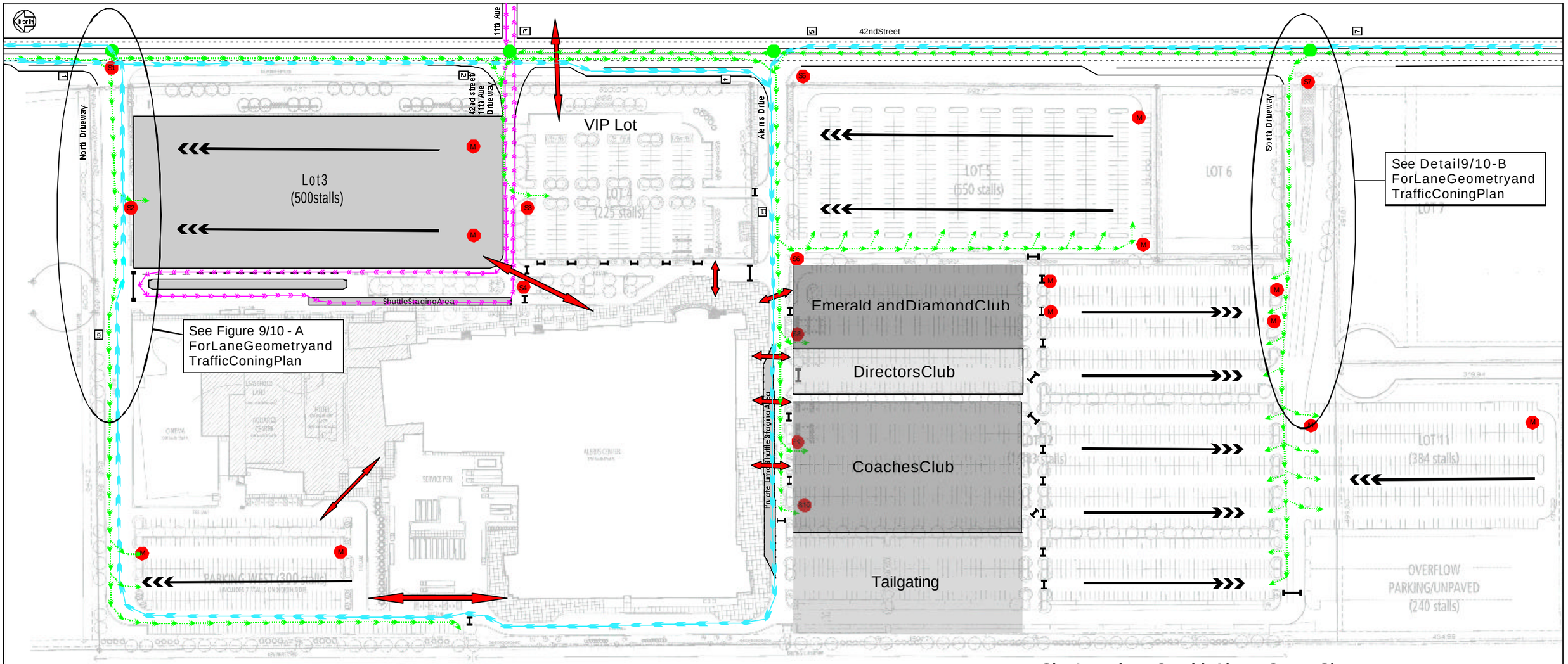
Figure 9



Legend

- = Vehicle traffic (Inbound)
- = Private shuttles/limos
- =Altru/UND shuttle
- = Blocked entrance
- = Pedestrian flow
- = Direction o f fill
- = Stationary parkingattendant
- = Parking attendant moves with vehicles as rows fill
- = Traffic control officer

Signage Key

Stationarysigns

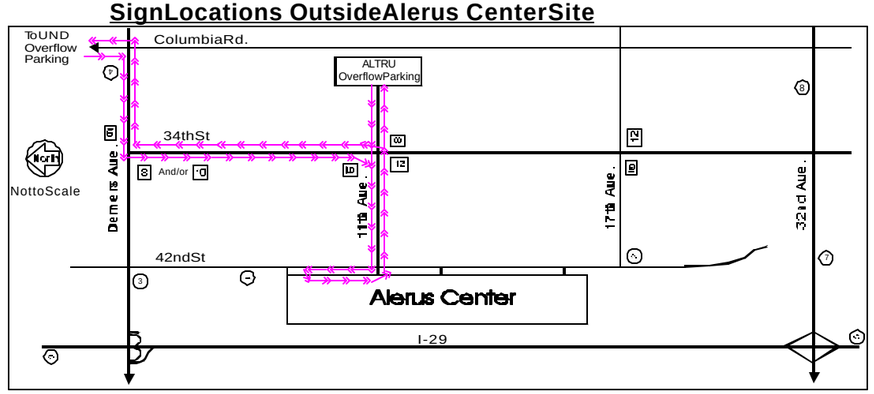
1	HANDICAP/ DROP-OFF/ VIP/CLUB PARKING	EVENT PARKING	6	FORM ONE LANE	7 EVENT PARKING
2	DROP-OFF CLUB PARKING	VIP/HANDICAP ONLY	8	OVERFLOW PARKING ATALTRU	DROP-OFF/ VIP/CLUB/ HANDICAP PARKING
3	VIP/ HANDICAP ONLY	4 GENERAL EVENT PARKING	CLUB PARKING/ DROP-OFF	9 OVERFLOW PARKING ATALTRU	10 OVERFLOW PARKING ATUND
5	CLUB PARKING/ DROP-OFF	VIP/ HANDICAP PARKING	11 CLUB PARKING HAVEPASS READY	12 OVERFLOW PARKING ATALTRU	

VMSsigns

	Initial	WhenAlerusParkingisFull
1	GEN EVENT PARKING → RIGHT TWO LANES → VIP DROP-OFF → LEFT LANE	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFT ON 11THAVE
2	GEN EVENT PARKING → LEFT TWO LANES → VIP DROP-OFF/ CLUB → RIGHT LANE	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHT ON 11THAVE
3	EVENT PARKING → RIGHT ON 32NDST. → PARKING& FREE SHUTTLE → RIGHT ON 34THST	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHT ON 34THST
4	EVENT PARKING → LEFT ON 32NDST. → PARKING& FREE SHUTTLE → LEFT ON 34THST	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFT ON 34THST
5	ALERUS NEXT EXIT → RIGHT ON 32NDAVE	ALERUS NEXT EXIT → RIGHT ON 32NDAVE
6	ALERUS NEXT EXIT → LEFT ON DEMERS	ALERUS NEXT EXIT → LEFT ON DEMERS
7	EVENT PARKING → LEFTON 34TH STREET → PARKING& FREE SHUTTLE → LEFTON 34TH STREET	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → LEFTON 34TH STREET
8	EVENT PARKING → RIGHTON 34TH STREET → PARKING& FREE SHUTTLE → RIGHTON 34TH STREET	ALERUS PARKING FULL → PARKING& FREE SHUTTLE → RIGHTON 34TH STREET

*VMSSigns5,6,7,8areoptional

SignLocations OutsideAlerus CenterSite



FOOTBALL EVENT INBOUND TRAFFIC

ALERUSCENTEREVENTTRAFFICSTUDY

GrandForks-EastGrandForksMetropolitanPlanningOrganization

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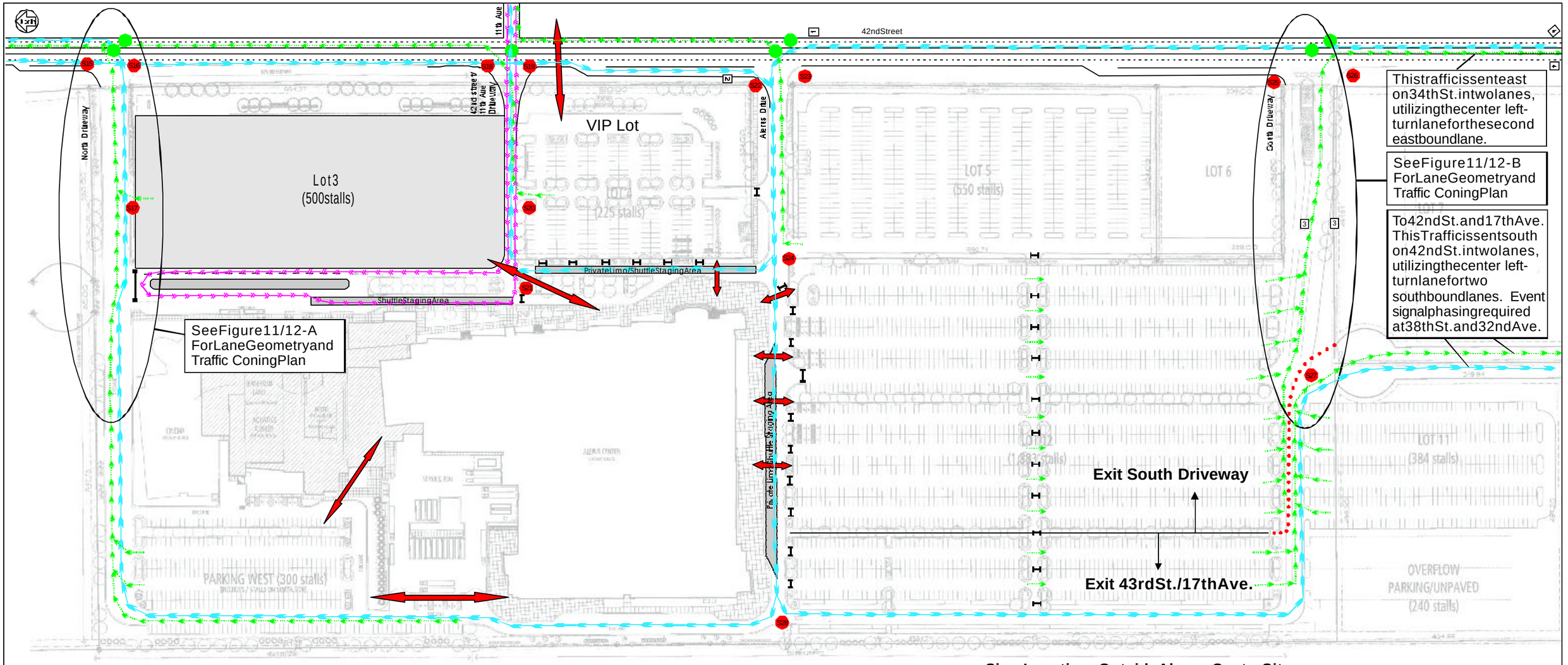
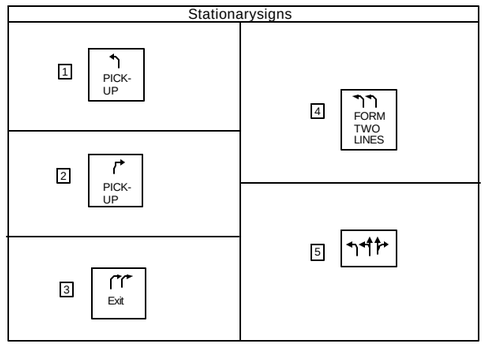
Figure 10



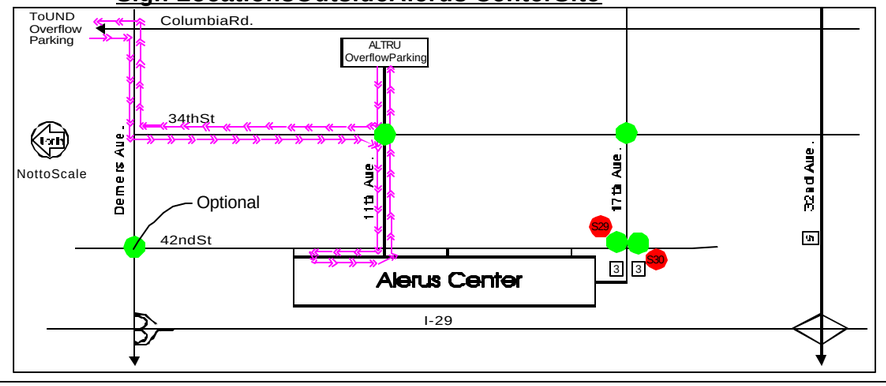
Legend

- = Vehicle traffic (Outbound)
- =Privateshuttles/limos
- = Altru/Alerus shuttle
- =Blockedentrance
- =Pedestrianflow
- S## = Stationaryparking attendant
- = Trafficcontrol officer
- =Cones

Signage Key



Sign LocationsOutsideAlerus CenterSite



GENERAL EVENT OUTBOUND TRAFFIC

Figure 11

ALERUS CENTER EVENTTRAFFICSTUDY
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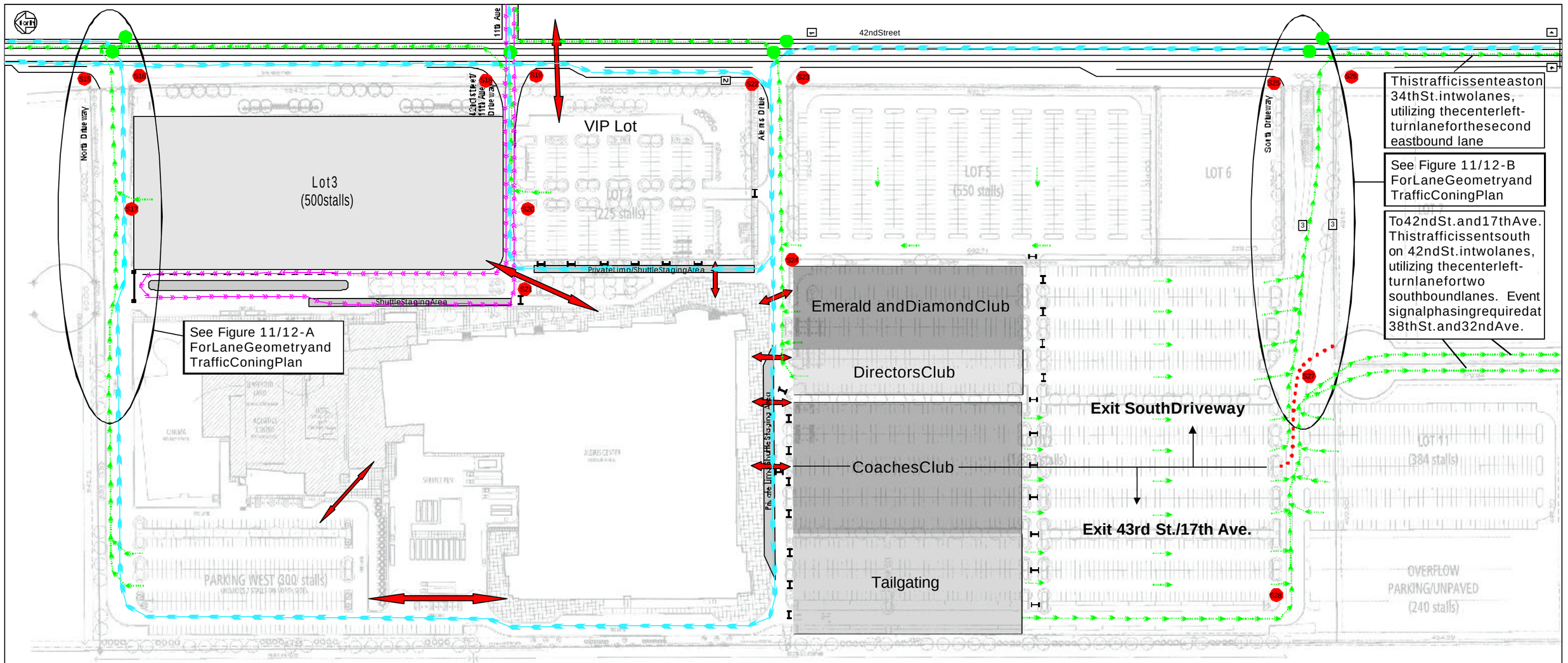
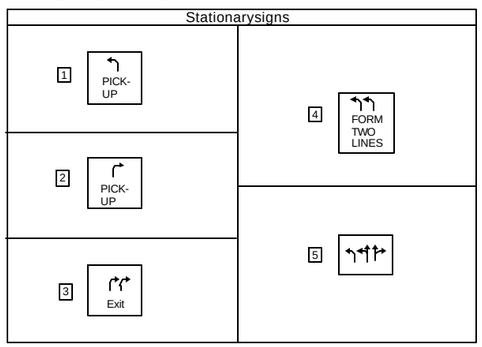


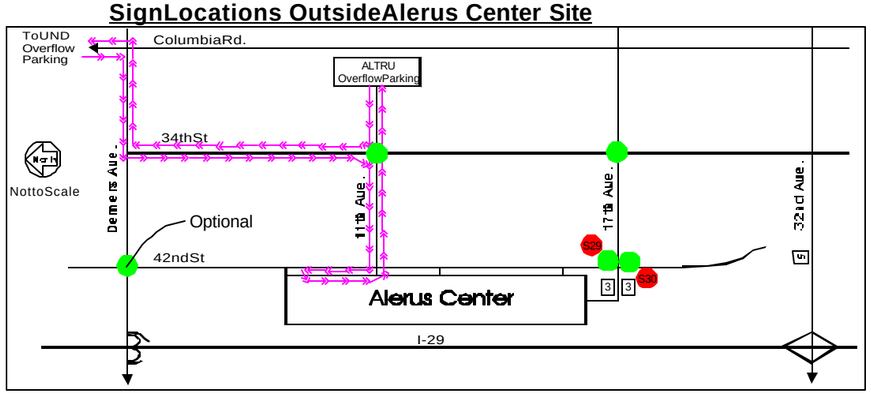
Legend

- = Vehicle traffic (Outbound)
- = Private shuttles/limos
- =Altru/UND shuttle
- = Blocked entrance
- = Pedestrian flow
- = Stationary parkingattendant
- = Traffic controlofficer
- = Cones

Signage Key



SignLocations OutsideAlerus Center Site



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FOOTBALL EVENT OUTBOUND TRAFFIC

ALERUSCENTEREVENTTRAFFICSTUDY
GrandForks-EastGrandForksMetropolitanPlanningOrganization

Figure 12

FIGURE 9/10-A
IN-BOUND NORTH DRIVEWAY DETAIL – CONING PLAN AND LANE GEOMETRY

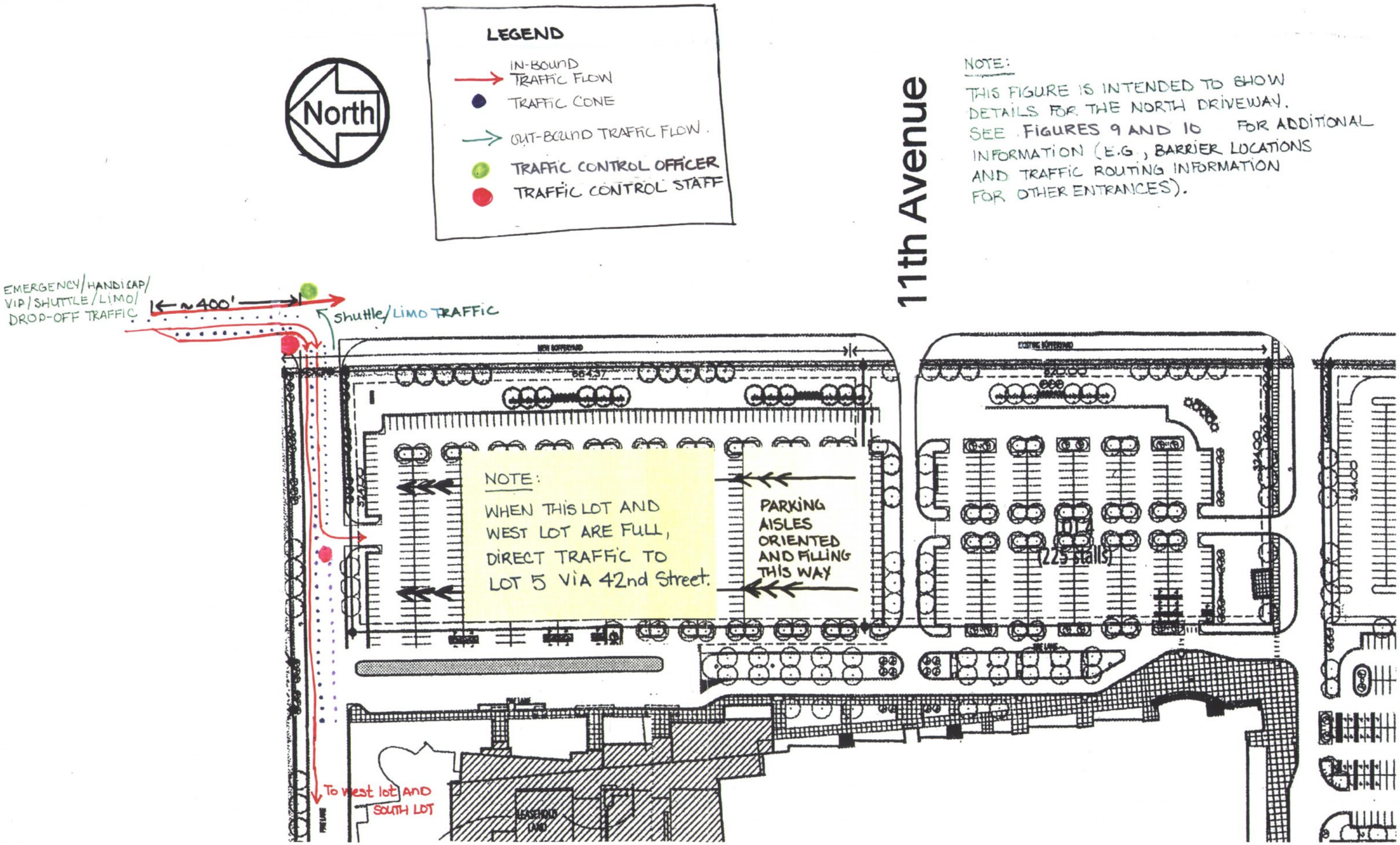

FIGURE 9/10-B
IN-BOUND SOUTH DRIVEWAY DETAIL – CONING PLAN AND LANE GEOMETRY

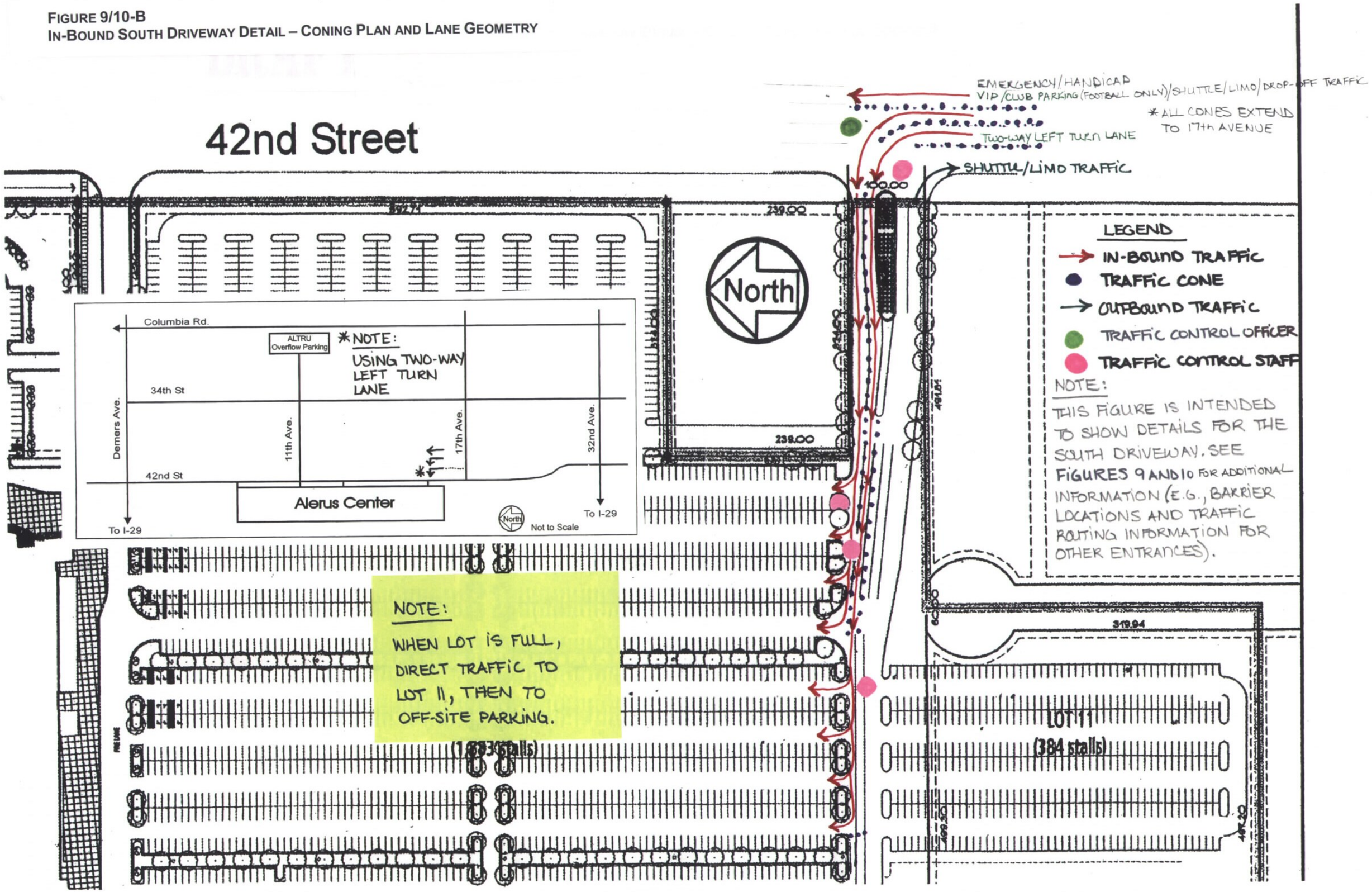

FIGURE 11/12-A
OUT-BOUND NORTH DRIVEWAY DETAIL – CONING PLAN AND LANE GEOMETRY

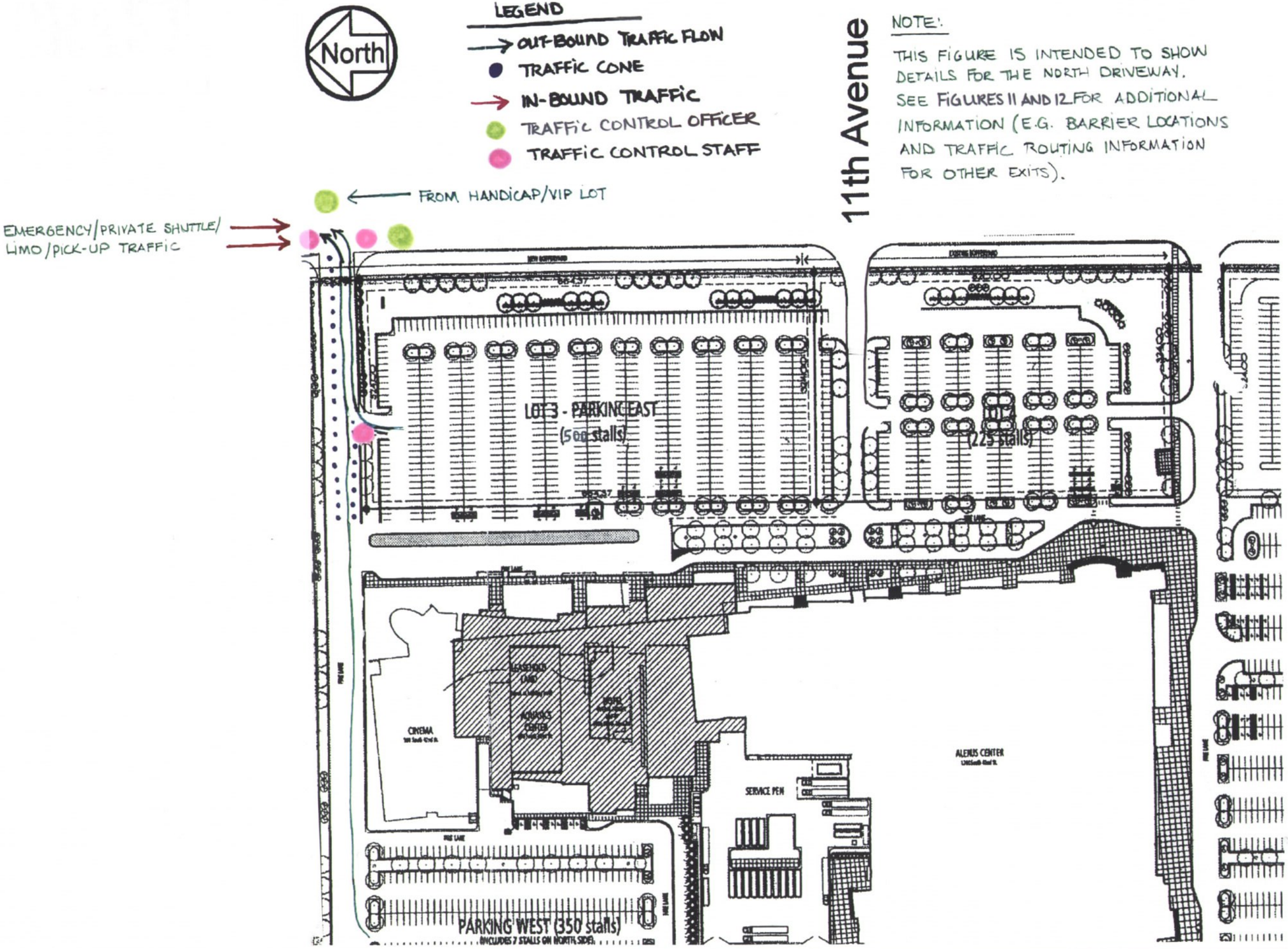

FIGURE 11/12-B
OUT-BOUND SOUTH DRIVEWAY DETAIL – CONING PLAN AND LANE GEOMETRY

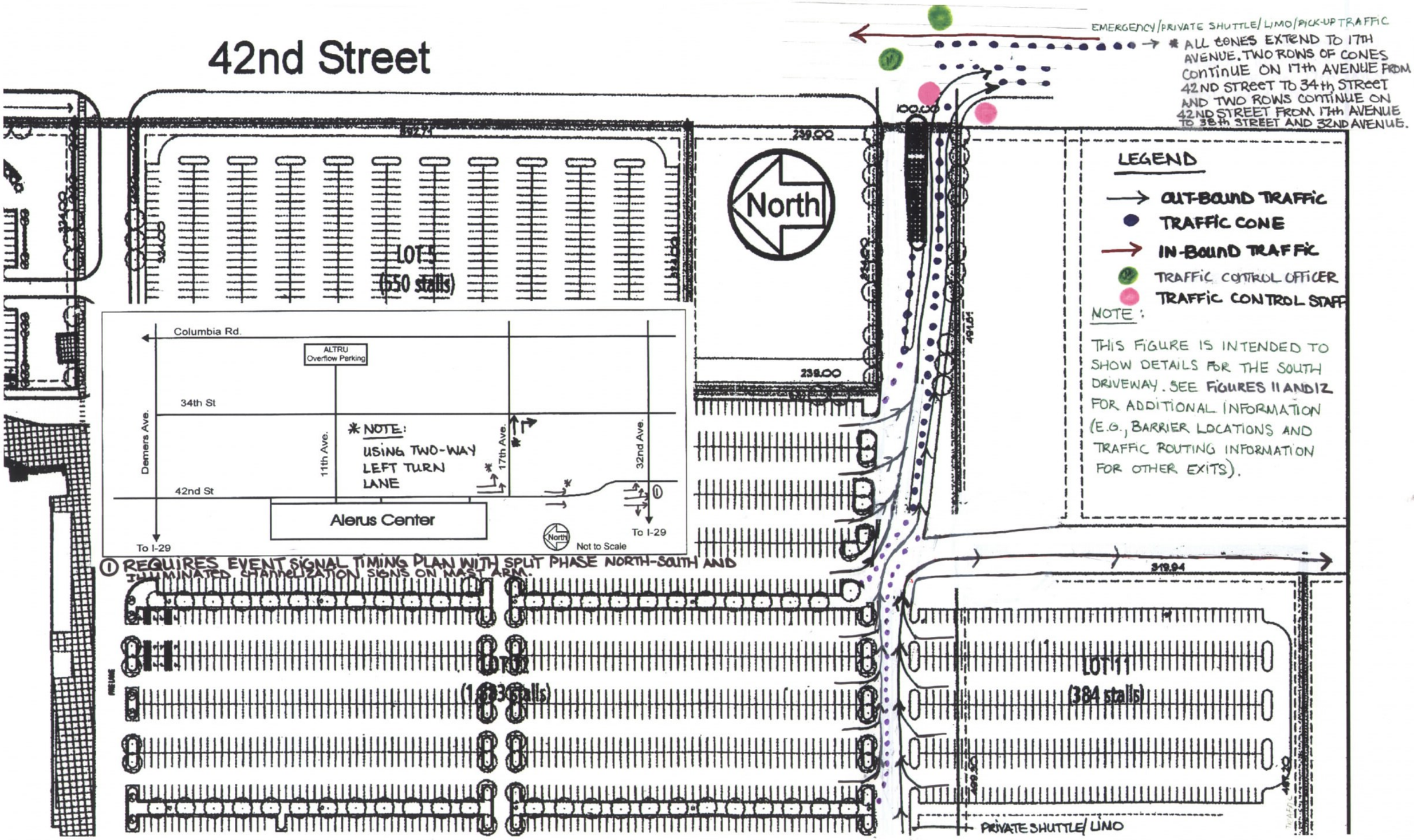

Table 7
Traffic Control Staff Summary Matrix

Event Type	Off-Duty Traffic Control Officers (Four Total)	Event Traffic Control Staff
General Event, In-Bound	o North Driveway, South Driveway – Controls conflicting traffic flows including in-bound disabled/VIP traffic, in-bound general event traffic, out-bound private shuttle/limo/drop-off traffic, and background traffic. **Two police officers**, one at each driveway. o 42nd Street/11th Avenue South Intersection – Controls conflicting traffic flows including in-bound disabled/VIP traffic, in-bound general event traffic, Altru shuttle traffic, out-bound private shuttle/limo/drop-off traffic, and background traffic. **One police officer** o 42nd Street/Alerus Drive Intersection – Controls conflicting traffic flows including in-bound private shuttle/limo/drop-off traffic, in-bound general event traffic, and background traffic. **One police officer**	o S1 – Aids police officer in controlling traffic entering the site at the north driveway and makes sure traffic is effectively using both right turn lanes. When the northeast lot (Lot 3) and the west lot (Parking West) fill, this staff person closes the north driveway and aids the police officer in directing southbound general traffic to the southeast lot (Lot 5) or to off-site parking. o S2 – Controls traffic entering the northeast lot (Lot 3) and makes sure only one lane of traffic turns into the parking lot. When Lot 3 fills, this staff person notifies S1 to close the north driveway and direct the traffic to Lot 5 or off-site parking. o S3 – Controls traffic entering the disbaled/VIP lot (Lot 4). o S4 – Controls shuttle bus and pedestrian traffic where significant conflict is possible. o S5 – Aids police officer in controlling traffic entering Alerus Drive from both the north and the south on 42nd Street. Redirects traffic to off-site parking when Lot 5 fills. o S6 – Directs private shuttle/limo traffic and handicap patron traffic to the west and general vehicle traffic into Lot 5. When Lot 5 fills, this staff person notifies S1 and S5 to direct general traffic to off-site parking. o S7 – Aids police officer in controlling traffic entering the site at the south driveway and makes sure traffic is effectively using both left turn lanes. Redirects traffic to off-site parking when Lots 11 and 12 fill. o S8 – Controls traffic entering the disabled parking area of Lot 12.
Football Game, In-Bound	o North Driveway, South Driveway – Controls conflicting traffic flows including in-bound disabled/VIP traffic, in-bound Club traffic, in-bound tailgating traffic, in-bound general event traffic, out-bound private shuttle/limo/drop-off traffic, and background traffic. **Two police officers**, one at each driveway. o 42nd Street/11th Avenue Intersection – Controls conflicting traffic flows including in-bound disabled/VIP traffic, in-bound Club traffic, in-bound tailgating traffic, in-bound general event traffic, Altru/UND shuttle traffic, out-bound private shuttle/limo/drop-off traffic, and background traffic. **One police officer** o 42nd Street/Alerus Drive Intersection – Controls conflicting traffic flows including in-bound private shuttle/limo/drop-off traffic, in-bound Club traffic, in-bound tailgating traffic, in-bound general event traffic, and background traffic. **One police officer**	o S1 – Aids police officer in controlling traffic entering the site at the north driveway and makes sure traffic is effectively using both right turn lanes. This staff person reroutes the southbound through traffic lane to the southeast lot (Lot 5) when the west lot (Parking West) is 2/3 full, filling the remainder of Lot 5 with traffic from the right-turn bay, and closes the right turn bay and the north driveway to in-bound traffic when the northeast lot (Lot 3) fills, redirecting all southbound general traffic to the southeast lot (Lot 5) or to off-site parking. o S2 – Controls traffic entering the northeast lot (Lot 3) and makes sure only one lane of traffic turns into the parking lot. When Lot 3 fills, this staff person notifies S1 to close the north driveway and direct the traffic to Lot 5 or off-site parking. o S3 – Controls traffic entering the disabled/VIP lot (Lot 4). o S4 – Controls shuttle bus and pedestrian traffic where significant conflict is possible. o S5 – Aids police officer in controlling traffic entering Alerus Drive from both the north and the south on 42nd Street. Redirects traffic to off-site parking when Lot 5 fills. o S6 – Directs private shuttle/limo and club (e.g., Coaches Club, Directors Club, etc.) traffic to the west and general vehicle traffic into Lot 5. When Lot 5 fills, this staff person notifies S1 and S5 to direct general traffic to off-site parking. o S7 – Aids police officer in controlling traffic entering the site at the south driveway and makes sure traffic is effectively using both left turn lanes. Redirects traffic to off-site parking when Lots 11 and 12 fill. o S8 – Controls traffic entering the Directors and Emerald and Diamond Club parking areas. Verifies each vehicle has the appropriate pass. o S9, S10 – Controls traffic entering the Coaches Club parking area. Verifies each vehicle has the appropriate pass.

Table 7
Traffic Control Staff Summary Matrix

Event Type	Off-Duty Traffic Control Officers (Twelve Total)	Event Traffic Control Staff
Out-Bound	o North Driveway – Controls conflicting traffic flows including out-bound disabled/VIP traffic, out-bound general event traffic, out-bound private shuttle/limo/drop-off traffic, background traffic. **Two police officers**, both at north driveway. o 42nd Street/11th Avenue South Intersection – Controls conflicting traffic flows including out-bound disable/VIP traffic, out-bound general event traffic, Altru/UND shuttle traffic, and background traffic. **One police officer** o 42nd Street/Alerus Drive Intersection – Controls conflicting traffic flows including in-bound private shuttle/limo/pick-up traffic and out-bound general event traffic. **Two police officers**, both at 42nd Street/Alerus Drive intersection. o South Driveway – Controls conflicting traffic flows including out-bound general event traffic, out-bound private shuttle/limo/pick-up traffic, and background traffic. **Two police officers**, both at south driveway. o 42nd Street/17th Avenue South Intersection – Controls conflicting traffic flows including out-bound event traffic and background traffic. **Two police officers**, both at 42nd Street/17th South Avenue intersection. o 11th Avenue South/34th Street Intersection – Controls conflicting traffic flows including out-bound event traffic, shuttle bus traffic, and background traffic. **One police officer** o 17th Avenue South/34th Street Intersection – Controls conflicting traffic flows including out-bound event traffic and background traffic. **One police officer** o 42nd Street/Demers Avenue (Optional) - Controls conflicting traffic flows including out-bound event traffic and background traffic. **One police officer**	o S15, S16 – Aids police officers in controlling traffic exiting the site at the north driveway and makes sure traffic is effectively using both left turn lanes. o S17 – Controls traffic exiting the northeast lot (Lot 3) and makes sure traffic is forming two left turn lanes. o S18, S19 – Aids police officer in controlling traffic exiting the site from the disabled/VIP lot (Lot 4). o S20 – Controls traffic exiting the disabled/VIP lot (Lot 4). o S21 – Controls shuttle bus and pedestrian traffic where significant conflict is possible. o S22, S23 – Aids police officers in controlling emergency/private shuttle/limo/pick-up traffic entering the site at Alerus Drive and traffic exiting the site at Alerus Drive from the southeast lot (Lot 5). o S24 – Directs emergency/private shuttle/limo/pick-up traffic and general vehicle traffic from Lot 5. o S25, S26 – Aids police officers in controlling traffic exiting the site at the south driveway and makes sure traffic is forming three right turn lanes. o S27 - Controls traffic exiting from the central and south lots (Lots 11 and 12) and makes sure traffic is forming three right turn lanes. *For general events only*, controls private shuttle/limo traffic and its merge with the Lot 11 and 12 traffic. o S28 *(General Event)* – Controls private shuttle/limo traffic and traffic exiting from the central lot (Lot 12). o S28 *(Football Game)* – Controls tailgating traffic and its merge with traffic exiting from the central lot (Lot 12). o S29, S30 *(Football Game)* – Aids officers in controlling traffic at the 17th Avenue South and 42nd street intersections, making sure southbound traffic is effectively using both left-turn lanes to access eastbound 17th Avenue South and both right-turn lanes to access southbound 42nd Street.

APPENDICES

Appendix A – Technical Memos

Appendix B – 11th Avenue South and 42nd Street Intersection Layout and Analysis

Appendix C – Cost Estimates

Appendix D – Shuttle Bus Analysis

Appendix E – Summary of Interim Plans